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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

Geneva

TECHNICAL WORKING PARTY ON AUTOMATION AND COMPUTER PROGRAMS

Thirty-First Session
Seoul, June 4 to 7, 2013

REPORT

adopted by the
Technical Working Party on Automation and Computer Programs

Opening of the Session

1. The Technical Working Party on Automation and Computer Programs (TWC) held its thirty-first session in Seoul, from June 4 to 7, 2013. The list of participants is reproduced in Annex I to this report.

2. The TWC was welcomed by Mr. Shin Hyun Kwan, Director General, Korean Seed and Variety Service (KSVS), Ministry of Agriculture, Food and Rural Affairs (MAFRA). A copy of the welcome address is provided in Annex II to this report.

3. The TWC received a presentation on the plant variety protection (PVP) system in the Republic of Korea from Mr. Lee Sang Hyug, Director, Plant Variety Protection Division, KSVS, MAFRA. A copy of the presentation is provided in Annex III to this report.

4. The session was opened by Mr. Sami Markkanen (Finland), Chairperson of the TWC, who welcomed the participants and thanked the Republic of Korea for hosting the TWC session.

Adoption of the agenda

5. The TWC adopted the revised agenda as presented in document TWC/31/1 Rev., according to the order of agenda items agreed at the session.

Short reports on developments in plant variety protection

(a) Reports from members and observers

6. The TWC noted the information on developments in plant variety protection from members of the Union provided in document TWC/31/31 Prov.. The TWC noted that reports submitted to the Office of the Union during or after the session would be included in document TWC/31/31.

(b) Reports on developments within UPOV

7. The TWC received a presentation from the Office of the Union on the latest developments within UPOV, a copy of which is provided in document TWC/31/27.

Molecular techniques

8. The TWC considered document TWC/31/2.

9. The TWC noted the program for the adoption of document TGP/15/1 “Guidance on the Use of Biochemical and Molecular Markers in the Examination of Distinctness, Uniformity and Stability (DUS)”.

10. The TWC noted the discussion on molecular techniques at the forty-ninth session of the Technical Committee (TC).

11. The TWC noted that the TC had proposed to hold a coordinated meeting of the Working Group on Biochemical and Molecular Techniques, and DNA-Profiling in Particular (BMT) with the International Organization for Standardization (ISO), the International Seed Trade Association (ISTA) and the Organization for Economic Co-operation and Development (OECD) and including breeders; and that if it was not possible to organize a coordinated meeting in 2014, a meeting of the BMT would be organized in the meantime.

12. The TWC received a presentation from experts from China on the research on the construction of DNA fingerprint database in Maize and suggested that the information be made available to the BMT. A copy of the presentation is provided in document TWC/31/2 Add..

TGP documents

13. The TWC considered the TGP documents below on the basis of documents TWC/31/3 and TWC/31/3 Add..

14. The TWC noted the agreement of the TC and the Legal and Administrative Committee (CAJ) to submit document TGP/15/1 “Guidance on the Use of Biochemical and Molecular Markers in the Examination of Distinctness, Uniformity and Stability (DUS)” for adoption by the Council, at its forty-seventh session, to be held on October 24, 2013.

15. The TWC noted the agreement of the TC and the CAJ to invite the Council to adopt document TGP/14/2 “Glossary of Terms Used in UPOV Documents” at its forty-seventh session, to be held on October 24, 2013, and noted that the Council would be invited to adopt document TGP/0/6, in order to reflect the adoption of documents TGP/15/1 and TGP/14/2.

16. The TWC noted the matters approved by the TC for future revision of documents TGP/7, TGP/8 and TGP/9, as set out below:

(a) TGP/7: Development of Test Guidelines

(i) *Coverage of Types of Varieties in Test Guidelines*
(ii) *Selection of Asterisked Characteristics*
(iii) *Standard References in the Technical Questionnaire*
(iv) *Applications for Varieties with Low Germination*
(v) *Procedure for the Development of Test Guidelines*
(vi) *Quantity of Plant Material Required*
(vii) *Minimum Quantity of Plant Material*
(viii) *Guidance on Number of Plants to be Examined (for Distinctness)*
(ix) *Guidance for Method of Observation*
(x) *Example Varieties*
(xi) *Providing Photographs with the Technical Questionnaire*
(xii) *Duration of Test*
(xiii) *Number of Plants Required for Description*

(b) TGP/8: Trial Design and Techniques Used in the Examination of Distinctness, Uniformity and Stability

Part I: DUS Trial Design and Data Analysis

(i) *New Section 2: “Data to be recorded”*
(ii) *New Section: “Reduction of Size of Trials”*

Part II: Techniques Used in DUS Examination

(i) *Section 3: "The Combined-Over-Years Criteria for Distinctness (COYD)"*
(ii) *Section 3, Subsection 3.6: "Adapting COYD to special circumstances"*
(iii) *Section 4: "2x1% Method-Minimum Number of Degrees of Freedom for the 2x1% Method"*

(c) TGP/9: Examining Distinctness

(i) *Guidance on Number of Plants to be Examined (for Distinctness)*
(ii) *Providing Photographs with the Technical Questionnaire*

17. The TWC noted the agreement of the TC that a draft revision of document TGP/5 Section 10 "Notification of Additional Characteristics and States of Expression" be presented for consideration by the TC at its fiftieth session, subject to the conclusion of discussions on disclaimers on UPOV documents in the Consultative Committee.

18. The TWC noted the program for the development of TGP documents, as set out in the Annex to document TWC/31/3.

19. The TWC also noted the matters for discussion on future revision of documents TGP/7, TGP/8 and TGP/14 that would be considered on the basis of documents TWC/31/9, TWC/31/10, TWC/31/11, TWC/31/12, TWC/31/13, TWC/31/14, TWC/31/15 Corr., TWC/31/15 Add., TWC/31/16, TWC/31/17, TWC/31/18, TWC/31/18 Add., TWC/31/19, TWC/31/20, TWC/31/20 Add., TWC/31/21 and TWC/31/23 Rev., respectively.

20. The TWC considered the TGP documents below on the basis of documents TWC/31/3, TWC/31/3 Add. and the documents listed above.

Revision of TGP documents

TGP/7: Development of Test Guidelines

(i) Revision of document TGP/7: Additional Standard Wording for Growing Cycle for Tropical Species

21. The TWC considered document TWC/31/9.

22. The TWC considered the proposed Additional Standard Wording (ASW) for growing cycle of tropical species and agreed with the proposed wording and the modifications proposed by the Technical Working Party for Fruit Crops (TWF), as follows:

New (after (b)): ~~Tropical fruit species~~ Evergreen species with indeterminate growth The growing cycle is considered to be the period ranging from the beginning of flowering of an individual flower or inflorescence, through active flowering and fruit development, and concluding with the harvesting of fruit.

(ii) Revision of document TGP/7: Source of Propagating Material

23. The TWC considered the proposed guidance on source of propagating material, as presented in Section IV "Guidance for drafting Test Guidelines" of the Annex to document TWC/31/10 and noted the document provided useful information on the effects of the source of propagating material, and agreed with the request for the preparation of a condensed version as a source of general guidance for drafters of Test Guidelines, for inclusion in document TGP/7.

24. The TWC requested the drafter to avoid the reference to Wikipedia (page 7) in order to make sure to refer to a reliable information source.

(iii) Revision of document TGP/7: Indication of Growth Stage in Test Guidelines

25. The TWC considered document TWC/31/11 and agreed that there was no need to amend the existing guidance in document TGP/7 with regard to the indication of the growth stage at which to observe characteristics in the Test Guidelines.

(iv) Revision of document TGP/7: Providing Illustrations of Color in Test Guidelines

26. The TWC considered the guidance proposed in paragraph 6 of document TWC/31/12.

27. The TWC agreed with the following guidance proposed by the Technical Working Party for Ornamental Plants and Forest Trees (TWO), at its forty-sixth session, and the TWF, at its forty-fourth session, with the inclusion of the word "observed" at the last sentence, to be included in a future revision of document TGP/7:

"~~Particular caution is needed when considering the~~ It is generally not appropriate to use ~~of~~ illustrations of color, as such, in the Test Guidelines because the color in photographs can be affected by the technology of the camera, ~~and~~ the facilities used to display the photograph (including printer, computer and screen~~, etc.~~) and lighting conditions under which the photograph is taken. Furthermore, the expression of color may vary according to the environment in which the variety is grown. For example, a photograph of a "~~light~~ weak intensity" of anthocyanin coloration provided by the Leading Expert in one UPOV member may not represent a "weak ~~light~~ intensity" of anthocyanin coloration observed in another UPOV member."

28. The TWC considered the wording "light intensity" to be inappropriate.

(v) Revision of document TGP/7: Presence of Leading Expert at Technical Working Party Sessions

29. The TWC considered document TWC/31/13 and agreed with the proposed guidance on the presence of leading experts at Technical Working Party sessions, for inclusion in a future revision of document TGP/7, section 2.2.5.3, as set out below:

"2.2.5.3 Requirements for draft Test Guidelines to be considered by the Technical Working Parties

"Unless otherwise agreed at the TWP session, or thereafter by the TWP Chairperson, the timetable for the consideration of draft Test Guidelines by the Technical Working Parties is as follows:

Action	Latest date before the TWP session
Circulation of Subgroup draft by Leading Expert:	14 weeks
Comments to be received from Subgroup:	10 weeks
Sending of draft to the Office by the Leading Expert:	6 weeks
Posting of draft on the website by the Office:	4 weeks

"In cases where *either* of the deadlines for circulation of the Subgroup draft or for the sending of the draft to the Office by the Leading Expert is not met, the Test Guidelines would be withdrawn from the TWP agenda and the Office would inform the TWP accordingly at the earliest opportunity (i.e. not later than 4 weeks before the TWP session). In those cases where draft Test Guidelines are withdrawn from the TWP agenda because of failure by the Leading Expert to meet the relevant dates, it would be possible for specific matters concerning those Test Guidelines to be discussed at the TWP session. However, to consider specific matters it would be necessary for a document to be provided to the Office at least 6 weeks before the TWP session."

"In order to be considered by a Technical Working Party, the Leading Expert of the draft Test Guidelines should be present at the session, unless a suitable alternative expert can be arranged to act as the Leading Expert sufficiently in advance of the session, or unless the Leading Expert is able to participate by electronic means."

TGP/8: Trial Design and Techniques Used in the Examination of Distinctness, Uniformity and Stability

(i) Revision of document TGP/8: Part I: DUS Trial Design and Data Analysis, New Section: Minimizing the Variation due to Different Observers

30. The TWC considered document TWC/31/14.

31. The TWC noted that the drafter from the Netherlands was no longer participating in the TWC meetings and that it was not possible to indicate another expert(s) from the TWC to continue the work. However, the TWC noted that the TWO and Technical Working Party for Vegetables (TWV) had proposed experts to help to develop further guidance, on the proposed text to be included in TGP/8 Part I: DUS Trial and Design and Data Analysis, New Section: Minimizing the Variation due to Different Observers, in a future revision of document TGP/8, with regard to guidance on PQ and QN/MG characteristics.

32. The TWC noted that the TWF had proposed that an expert from New Zealand would report at its forty-fifth session, on the work done on the "Publication of harmonized variety description for apple for an agreed set of varieties", in order to consider if it could be relevant to further develop the study.

(ii) Revision of document TGP/8: Part II: Selected Techniques Used in DUS Examination, Section 3: Method of Calculation of COYU

33. The TWC noted that a revision of document TGP/8: Part II: Selected Techniques Used in DUS Examination, Section 3: Method of Calculation of COYU would be considered on the basis of documents TWC/31/15 Corr. and TWC/31/15 Add. under agenda item 11 "Development of COY: possible proposals for improvements to COYU".

(iii) Revision of document TGP/8: Part II: Selected Techniques Used in DUS Examination, Section 10: Minimum Number of Comparable Varieties for the Relative Variance Method

34. The TWC considered document TWC/31/16.

35. The TWC noted the comments made by the TWPs at their sessions in 2012 and the TC, at its forty-ninth session in 2013.

36. The TWC agreed that all mentions to "threshold limit" should be replaced by "threshold" including the title of section 10.2, which should read "10.2 Threshold for different sample sizes". The TWC proposed that the second sentence of paragraph 10.2.1 should read:

"For example, if the ~~actual sample size of the~~ number of comparable varieties is ~~60~~ 1, and the ~~number of comparable varieties is limited for that species~~ sample size is 60 for that variety, then the threshold ~~limit~~ is 1.84 (df1 =60, df2 =60)".

(iv) Revision of document TGP/8: Part II: Selected Techniques used in DUS Examination, New Section: Examining DUS in Bulk Samples

37. The TWC considered document TWC/31/17.

38. The TWC noted that the TC had agreed to replace the proposed text for new Section 11 "Examining DUS in Bulk Samples" in the Annex to document TC/49/28 with guidance on the use of characteristics examined on the basis of bulk samples, in order to ensure that the characteristics fulfill the basic requirements for a characteristic.

39. The TWC agreed that Leading Experts of Test Guidelines could be requested to provide data from different years to demonstrate that the expression of the characteristic was "sufficiently consistent and repeatable in a particular environment".

(v) Revision of document TGP/8: Part II: Selected Techniques Used in DUS Examination", New Section: Data Processing for the Assessment of Distinctness and for Producing Variety Descriptions

40. The TWC considered document TWC/31/18.

41. The TWC considered the developments on a practical exercise with a common data set to produce variety descriptions of self-pollinated and/or vegetatively propagated varieties, in order to determine the aspects in common and divergence between methods, with a view to developing general guidance. The TWC welcomed the data set of Flax varieties offered by the experts from France for the practical exercise.

42. The TWC received a presentation by an expert from the United Kingdom on a preliminary use of the Flax data set to illustrate two different methods from the United Kingdom, as contained in document TWC/31/18 Add.. The TWC noted that the document had been prepared to illustrate the way in which the different methods could be applied and noted that in the United Kingdom one of the methods was currently applied to herbage crops, and so might not be suitable for Flax, and would need to be evaluated.

43. The TWC noted that there was no guidance on the production of variety descriptions for cross pollinated, self-pollinated or vegetatively propagated crops.

44. The Office of the Union reported that data sets of Chrysanthemum and Pea had been received from Japan and the Netherlands, respectively, and would be made available for the experts participating in the practical exercise.

45. The TWC agreed that the Office of the Union should seek to ensure that the crops and data in the practical exercise would enable all methods for self-pollinated and/or vegetatively propagated varieties mentioned to be included.

(vi) Revision of document TGP/8: Part II: Selected Techniques Used in DUS Examination, New Section: Guidance of Data Analysis for Blind Randomized Trials

46. The TWC considered document TWC/31/19 and noted that the draft guidance should be described in general terms to become suitable for crops tested in plots or as individual plants and for the observation of the different types of characteristics (QN, PQ, QL).

47. The TWC agreed that the section describing the method of preparation of the trial should be further developed to clarify the procedure for coding the varieties to be used. The TWC requested an improvement to the example used in paragraph 4 with random allocation of codes and the duplication of all samples used, including "C" (Mixture).

48. The TWC agreed that the guidance should include statistical consideration on the design of the trial, such as that the number of replications should be sufficiently large to ensure that there was only a small probability (e.g.<0.05 or 0.01) that the candidate variety was correctly labelled by chance.

49. The TWC agreed that the draft guidance should provide information about analysis of the results.

(vii) Revision of document TGP/8: Part II: Selected Techniques Used in DUS Examination, New Section: Examining characteristics using image analysis

50. The TWC noted that the revision of document TGP/8: Part II: New Section: Statistical Methods for Visually Observed Characteristics would be considered on the basis of documents TWC/31/20 and TWC/31/20 Add. under agenda item 9 "Image analysis".

(viii) Revision of document TGP/8: Part II: New Section: Statistical Methods for Visually Observed Characteristics

51. The TWC considered document TWC/31/23 Rev..

52. TWC noted that the TC had agreed that it would not be appropriate to continue the development of a section on "Statistical Methods for Visually Observed Characteristics", unless new guidance was provided beyond the methods already provided in document TGP/8.

53. The TWC agreed that the method proposed in Annex II to document TC/49/32 was new and considered that it had advantages over the Chi-square test already provided in document TGP/8 for multinomial distributed data, such as visually observed characteristics, whereas COYD for normally distributed data is not suitable for multinomial distributed data.

54. The TWC agreed that it would be beneficial to further develop the method for multinomial data and to compare the decisions made using the two methods based on real data from Finland and the United Kingdom (Timothy, Red Clover and Meadow Fescue: growth habit).

55. The TWC noted that Finland planned to use the new method for multinomial data, once it had been established and potentially also the United Kingdom.

TGP/14: Glossary of Terms Used in UPOV Documents

Revision of document TGP/14: Section 2: Botanical Terms, Subsection 3: Color, Definition of "Dot"

56. The TWC considered document TWC/31/21.

57. The TWC agreed with the TWO, TWF and TWV that “dot” was a small “spot” and that only the term “spot” should be used in the future, according to the guidance provided in document TGP/14: Section 2: Botanical Terms, Subsection 3: Color. The TWC noted that the TWO, TWF and TWV had proposed that the Test Guidelines should be revised whenever the use of these terms could cause confusion, but noted the view of experts that there might be a need to use the terms separately in some languages.

Information and databases

(a) UPOV information databases

58. The TWC considered document TWC/31/5.

59. The TWC noted the amendments to UPOV codes and the plan of the Office of the Union to prepare tables of UPOV code additions and amendments, for checking by the relevant authorities, for each of the TWPs sessions in 2013.

60. The TWC noted the developments concerning the program for improvements to the Plant Variety Database (“Program”) since the thirtieth session of the TWC, as set out in paragraphs 10 to 22 to document TWC/31/5.

61. The TWC noted the plans of the Office of the Union to conduct a survey of members of the Union on their use of databases for plant variety protection purposes and on their use of electronic application systems.

62. The TWC received a demonstration of the video tutorial on how to use PLUTO database, which is available from the UPOV website at: http://upov.int/pluto/en/.

(b) Variety description databases

63. The TWC considered documents TWC/31/6 and TWC/31/25.

64. The TWC noted the developments on variety description databases and congratulated the experts from France on the study on the Pea Database. The TWC agreed on the possible use of image analysis for reducing distortion in some characteristics, while noting that image analysis had its own sources of distortion.

65. The TWC welcomed the offer from China to make a presentation on variation of variety descriptions over years in different locations, to be presented the TWC, at its thirty-second session.

(c) Exchangeable software

66. The TWC considered documents TWC/31/7, TWC/31/29 and TWC/31/30.

67. The TWC noted that the TC had concluded that the title of document UPOV/INF/16 “Exchangeable Software” and Section 1. “Requirements for exchangeable software” should remain unchanged, but that it would be useful to develop a separate information document that would allow members of the Union to provide information on the use of non-customized software and equipment that was used by members of the Union.

68. The TWC noted that the TC had:

(a) agreed with the inclusion of “Information System (IS) used for Test and Protection of Plant Varieties in the Russian Federation” and the AIM software from France in document UPOV/INF/16;

(b) requested the Office of the Union to investigate the possibility of the translation of “Information System (IS) used for Test and Protection of Plant Varieties in the Russian Federation” into English on the basis that the Russian Federation would verify the translation provided by the Office of the Union; and

(c) requested the Office of the Union to translate the AIM software to English on the basis that France would verify the translation provided by the Office of the Union.

69. The TWC noted that the TC had agreed with inclusion of the information contained in the Annex II to document TWC/31/5 for a revision of document UPOV/INF/16 by the Council at its forty-seventh session, to be held in Geneva on October 24, 2013.

70. The TWC received a presentation by an expert of France on the development of a color analysis process using AIM software which would be used in DUS testing in France, as presented in the Annex to document TWC/31/29. The TWC agreed on the importance of the environmental conditions in taking photos for the image analysis.

71. The TWC received a presentation on the SISNAVA and SIVAVE software proposed by Mexico for inclusion in document UPOV/INF/16 “Exchangeable software”, as presented in the Annex to document TWC/30/30, which was made by an expert from Mexico by electronic means.

72. The TWC agreed that the SIVAVE software proposed by Mexico was suitable for inclusion in document UPOV/INF/16.

73. The TWC requested Mexico to provide further information on the SISNAVA software to clarify the method of determination for the crop specific limits of acceptance (sum of differences), including the role of the crop experts in this process, to be presented to the TWC at its thirty-second session.

(d) Electronic application systems

74. The TWC considered document TWC/31/8 and noted the developments concerning a prototype electronic form.

Variety denominations

75. The TWC considered document TWC/31/4 and noted the developments concerning the International Commission for the Nomenclature of Cultivated Plants of the International Union for Biological Sciences (IUBS Commission) and the International Society for Horticultural Science Commission for Nomenclature and Cultivar Registration (ISHS Commission), of relevance for UPOV.

Data loggers

76. The TWC considered document TWC/31/28 Rev..

77. The TWC noted the information provided on the updated survey on hand-held data capture devices in the Annex to document TWC/31/28 Rev. and agreed that a new circular should be issued by the Office of the Union inviting further entries in advance of the thirty-second session of the TWC.

Image analysis

78. The TWC considered documents TWC/31/20 and TWC/31/20 Add..

79. The TWC noted the information on software and hardware used for image analysis, as set out in Annex I to document TWC/31/20.

80. The TWC noted that the AIM software for image analysis would be considered in document TWC/31/7 “Exchangeable software”.

81. The TWC considered the draft of the new section “Examining Characteristics Using Image Analysis” for inclusion in document TGP/8, as contained in Annex to document TWC/31/20 Add. as presented by an expert from the European Union by electronic means. The TWC agreed that the expert from the European Union should revise the text to provide guidance on the use of the method with suitable language for inclusion in document TGP/8, to be presented to the TWPs at their sessions in 2014.

Uniformity assessment

(a) Assessing uniformity by off-types on the basis of more than one sample or sub-samples

82. The TWC considered document TWC/31/22.

83. The TWC noted that it had agreed that more detailed information and further analysis were needed in order to give guidance on consequences on the use of the different approaches presented in Annexes I to IV of document TWC/31/22, and that France, Germany and the Netherlands would present one or more concrete situations in their countries and the statistical basis of their analysis for its next session.

84. The TWC considered the statistical basis for the acceptable number of off-types in the subsample of 20 plants used in the context of a sample size of 100 plants, as provided in Annex V to document TWC/31/22, which was introduced by an expert from Germany by electronic means.

85. The TWC requested the experts from Germany to explain the Type I and Type II errors used in the statistical basis for the acceptable number of off-types in the subsample of 20 plants used in the context of a sample size of 100 plants. The TWC agreed that the statistical basis for this approach would continue to be discussed at its thirty-second session. The TWC agreed that it would not be appropriate to recommend this approach for other crops or sample sizes before it had agreed on the statistical basis.

86. The TWC noted that, with regard to the approach combining the results from two growing cycles, as set out in Annexes I and II to document TWC/31/22, Situation A and B, the TC had agreed that care would be needed when considering results that were very different in each of the growing cycles, such as when a type of off-type was observed at a high level in one growing cycle and was absent in another growing cycle.

87. The TWC noted information on testing of uniformity of Apple varieties arising from mutation in New Zealand would be presented in document TWC/31/26.

(b) Testing Uniformity of Apple Varieties Arising from Mutation

88. The TWC considered document TWC/31/26.

89. The TWC considered the information on the assessment of uniformity and stability by off-types on the basis of two samples for apple varieties originating as mutations in New Zealand. The TWC noted that the statistical analyses were based on off-types tables and agreed with the TWV that the results from the two locations should not be combined, but treated as two separate samples.

Development of COY: possible proposals for improvements to COYU

90. The TWC considered document TWC/31/15 Corr. and received a presentation from an expert from the United Kingdom, as contained in document TWC/31/15 Add..

91. The TWC noted that the present method of calculation of COYU was overly strict due to the method of smoothing used and that very low probability levels were used in compensation (e.g. p=0.1%). The TWC agreed that the bias in the present method of calculation of COYU could be addressed by a change of smoothing method from “moving average” to “cubic smoothing splines”.

92. The TWC welcomed the offer by the experts from the United Kingdom to write software for the proposed COYU method in FORTRAN for integration into the DUST software and to present a demonstration version of the DUST software using the proposed COYU method at the thirty-second session of the TWC.

93. The TWC agreed that the probability levels to be used in the proposed COYU method should be discussed on the basis of the experience of UPOV members in using the proposed method.

94. The TWC agreed that a circular should be prepared by an expert from the United Kingdom and issued by the Office to the TC representatives, in order to investigate which members of the Union used the current COYU method and in which software it was used.

95. The TWC agreed that the document containing the proposal for an improvement to COYU should be summarized by an expert from the United Kingdom and presented to the TC at its fiftieth session and the TWP sessions to be held in 2014. The document should explain the bias of the present method that justified the proposed changes.

96. The TWC agreed that guidance should be developed on the minimum number of varieties that would be suitable for using the COYU method.

Guidance for drafters of Test Guidelines

97. The TWC considered document TWC/31/24.

98. The TWC noted the information in the TG Drafters’ webpage of the UPOV website, including the Revised Practical Guide for Drafters (Leading Experts) of UPOV Test Guidelines.

99. The TWC noted:

(a) the plan for the development of a prototype web-based TG Template for testing by interested experts by the end of 2013; and

(b) that the template would provide sufficient flexibility for drafters of Test Guidelines to introduce proposals that were not covered by existing standard wording and would retain flexibility in the structure for further development of Test Guidelines by UPOV members.

100. The TWC noted the file “Summary information on quantity of plant material required on adopted Test Guidelines” available on the TG Drafters’ webpage of the UPOV website.

Date and place of the next session

101. The TWC agreed to hold its thirty-second session in Helsinki, Finland, from June 3 to 6, 2014, with the preparatory workshop on June 2, 2014.

Chairperson

102. The TWC agreed to propose to the TC that it recommend to the Council to elect Mr. Adrian Roberts (United Kingdom), as the next chairperson of the TWC.

Future program

103. The TWC planned to discuss the following items during the thirty-second session:

1. Opening of the session

2. Adoption of the agenda

3. Short reports on developments in plant variety protection

   (a) Reports from members and observers (written reports to be prepared by members and observers)

   (b) Reports on developments within UPOV (document to be prepared by the Office of the Union)

4. Molecular techniques (document to be prepared by the Office of the Union and documents invited)

5. TGP documents

6. Information and databases

   (a) UPOV information databases (document to be prepared by the Office of the Union and documents invited)

   (b) Variety description databases (document to be prepared by the Office of the Union and documents invited)

   (c) Exchangeable software (document to be prepared by the Office of the Union and documents invited)

   (d) Electronic application systems (document to be prepared by the Office of the Union and documents invited)

7. Variety denominations (document to be prepared by the Office of the Union)

8. Uniformity assessment by off-types (documents to be prepared by France, Germany and the Office of the Union)

9. Data loggers (document to be prepared by the Office of the Union)

10. Image analysis (document to be prepared by the European Union)

11. Development of COYU (document to be prepared by the United Kingdom)

12. Database for researching TWC documents (document to be prepared by Germany)

13. Date and place of the next session

14. Future program

15. Report on the session (if time permits)

16. Closing of the session

Technical Visit

104. On the afternoon of June 5, 2013, the TWC visited the Seoul Agricultural Technology Center (SATC) operated by Seoul Metropolitan Government, where the TWC was welcomed by Mr. Bae Jeongbok, Director, Agricultural Education Division, SATC. The TWC received a presentation on SATC from

Mr. Kwon Hyukhyun, Deputy Director, Urban Agriculture Team, Agricultural Education Division, SATC, a copy of which is provided in Annex IV to this report. The TWC also visited the greenhouses of ornamental and vegetable crop farmers in the area.

105. The TWC adopted this report at the end of its session.

[Annexes follow]

ANNEX I

LIST OF PARTICIPANTS

I. MEMBERS

ARGENTINA

Alberto BALLESTEROS, Examiner for Cereal, Cotton and Forage Crops/Examinador técnico, Registro de Variedades, Secretaría de Agricultura, Ganadaría y Pesca, Ministerio de Agricultura, Ganadería, y Pesca, Venezueld 162 3 piso C 1095AAD Buenos Aires
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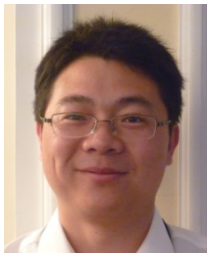

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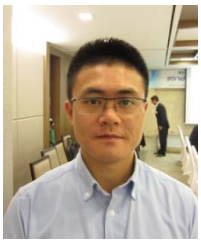

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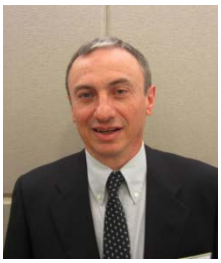

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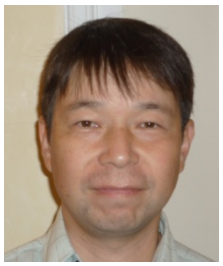

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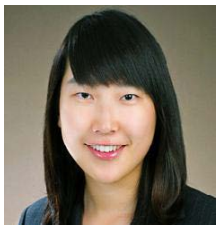

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[Annex II follows]

ANNEX II

WELCOME ADDRESS

Mr. Shin Hyunkwan
Director-General, Korea Seed & Variety Service (KSVS),
Ministry of Agriculture, Food and Rural Affairs (MAFRA)

Seoul, Republic of Korea, June 4, 2013

Distinguished delegates, and ladies and gentlemen,

Good morning.

I would like welcome all of you to this thirty-first session of the Technical Working Party on Automation and Computer Programs (TWC) of UPOV, which is held in the Republic of Korea. And it is my personal honor to be amongst you.
Personally, I hope this meeting will provide us happy moments of discussions and talks among delegates and attendees.

The Republic of Korea has been enforcing plant variety protection since 1998. The first five years was very tough. We struggled over not having many commercial plant varieties and discussing with farmers and stakeholders. After 15 years since the enforcement, now we feel we have a correct understanding for plant variety protection. Let me give you an example, as for individual plant breeders, there were only 200 of them in 2005, but by 2012 the number tripled to about 600 individual breeders.

In recent years, our attractive national varieties have gained popularity abroad. These are incredible developments, thanks to sincere efforts of the government, seed companies, agriculture research institutes, individual breeders, farmers and consumers. As a government organization that manages plant variety protection system, this is indeed a very rewarding experience.

The government of Republic of Korea is now implementing the “Development Plan of Seed Industry", which continues towards 2020. We expect this policy of corporation between the government and private entities will provide a springboard for the Republic of Korea to be a leading plant variety nation.

In order to clarify the identity of Plant Variety Protection System and strengthen plant breeder's rights, the Plant Variety Protection Act has been separated from Seed Industry Law since June 2013. The new provision stipulates that when the right of a plant breeder is violated, the previous fine of 30 million won (about 27,000 USD) has now increased to 100 million won (about 89,000 USD). And plant breeders' rights can be recovered via post-clearance payment.

The last 15 years was about establishing and raising awareness of plant variety protection system. The coming 15 years will be about the Republic of Korea’s effort to effectively manage the PVP system. I would like sincerely ask for your support and encouragement.

Once again I am grateful to your presence here at 31st UPOV TWC meeting. May I wish you a safe and pleasant stay in the Republic of Korea.

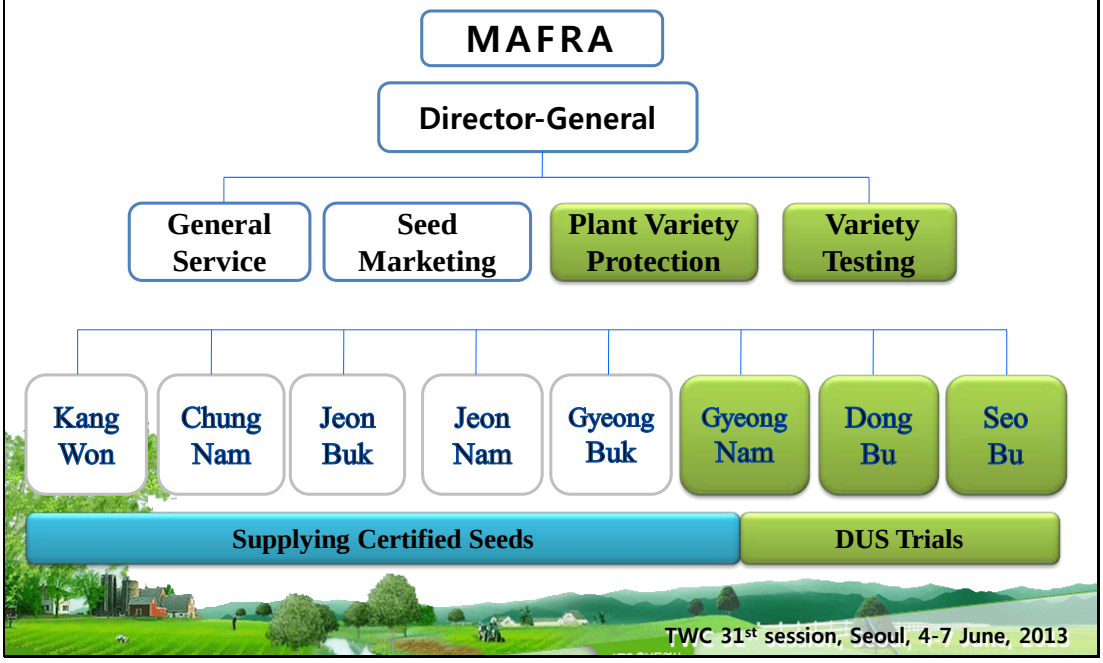
Thank you.

[Annex III follows]

Plant Variety Protection in Korea

TWC 31st session, Seoul, 4-7 June, 2013

KSVS Organization



TWC 31st session, Seoul, 4-7 June, 2013

Missions

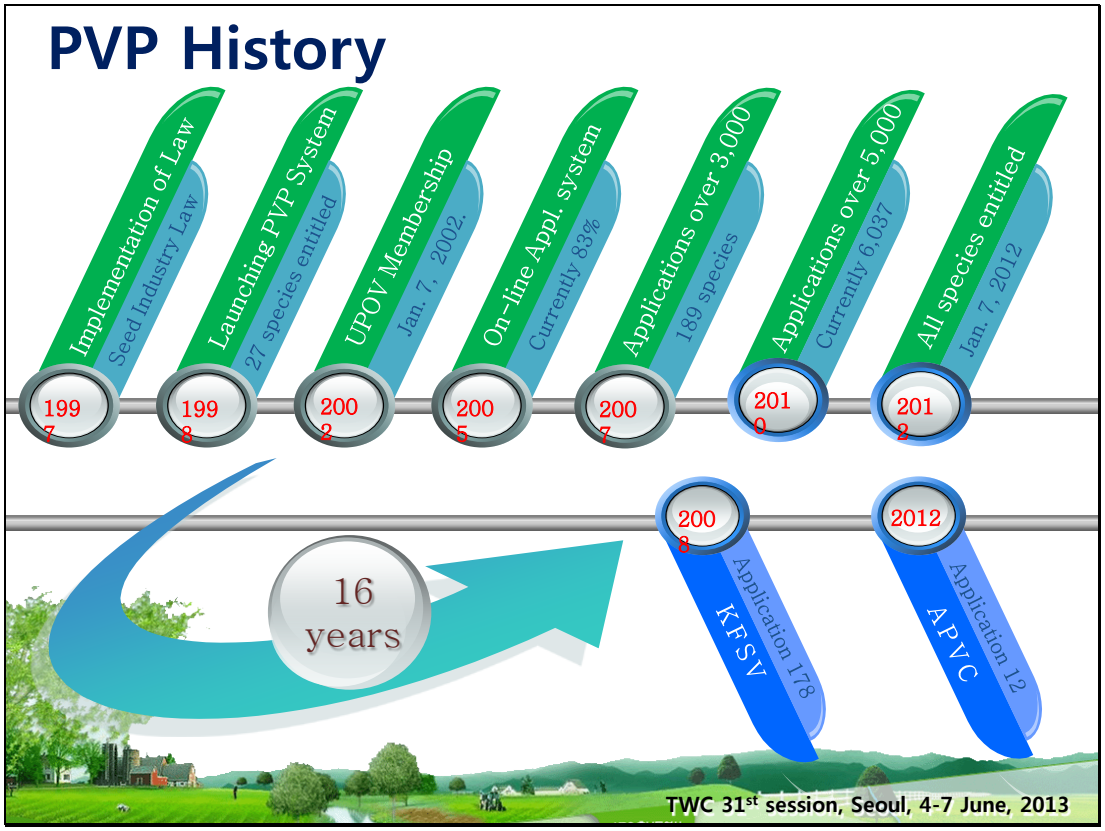
- Supplying Seeds of Agricultural Crops
- Supervising Circulation of High Quality Seeds
- DUS Test for Plant Breeders' Rights
- VCU Test for National Listing
- Seed Certification

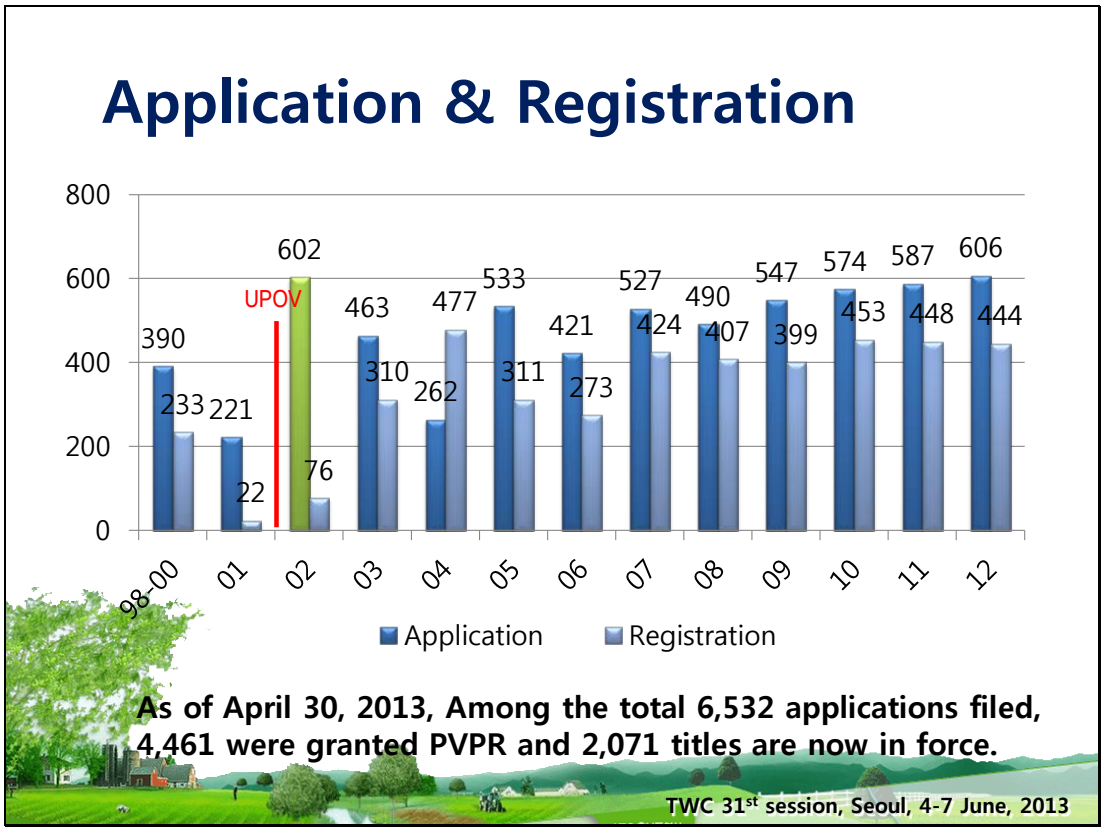
☑ Supplying Seeds of Agricultural Crops

-Production, processing & distribution
- Increase of staple food production & farmers' income
- Seed quality performed under ISTA accreditation

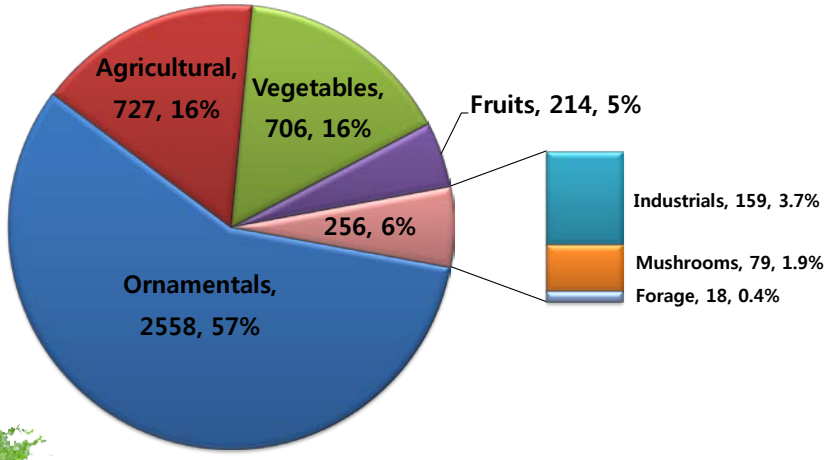

Supervising Circulation of High Quality Seeds
-To prevent losses caused by circulation of poor quality seeds
- educating the law regarding circulation inspection,
indication of seed quality, registration of seed business


Plant Variety Protection
- Varietal examination & ratification
- Improve varieties & encourage breeding activities


PVP History
Implementation of Law
Seed Industry Law
1997
Launching PVP System
27 species entitled
1998
UPOV Membership
Jan. 7, 2002.
2002
On-line Appl. system
Currently 83%
2005
Applications over 3,000
189 species
2007
Applications over 5,000
Currently 6,037
2010
All species entitled
Jan. 7, 2012
2012
16 years
2008
Application 178
KFSV
2012
Application 12
APVC
TWC 31st session, Seoul, 4-7 June, 2013


Application & Registration
800
600
400
200
0
UPOV
390
233
221
22
602
76
463
310
262
477
533
311
421
273
527
424
490
407
547
399
574
453
587
448
606
444
98-00
01
02
03
04
05
06
07
08
09
10
11
12
Application
Registration
As of April 30, 2013, Among the total 6,532 applications filed, 4,461 were granted PVPR and 2,071 titles are now in force.
TWC 31st session, Seoul, 4-7 June, 2013

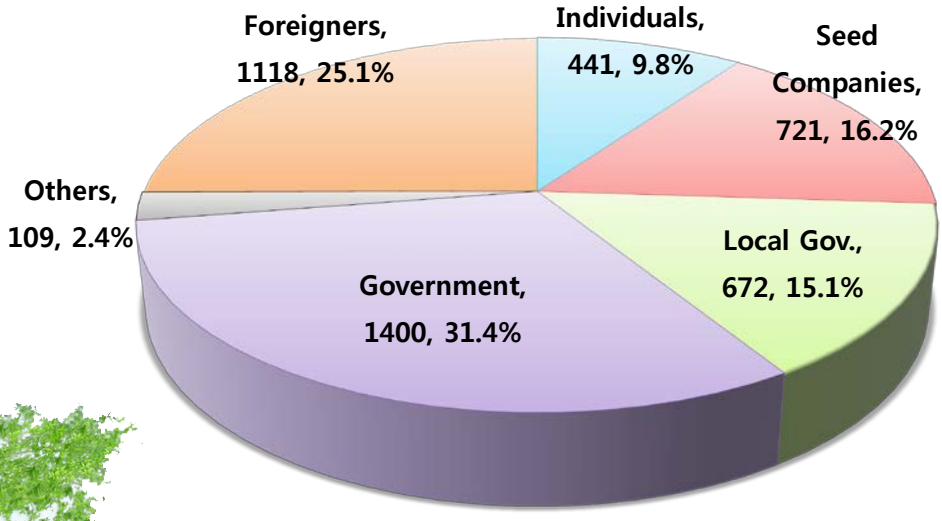
Registration by Crop Category



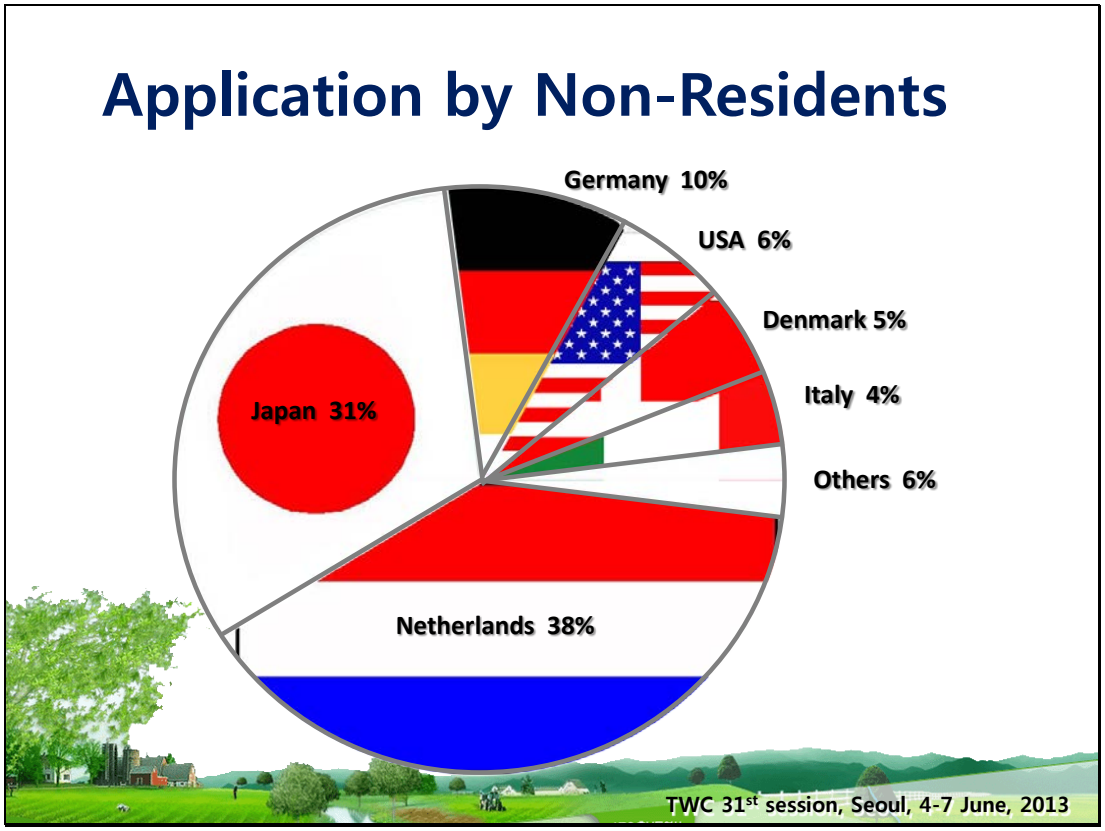
Total number of 4,461 registrations for plant breeders' rights had been filed until April 30, 2013.

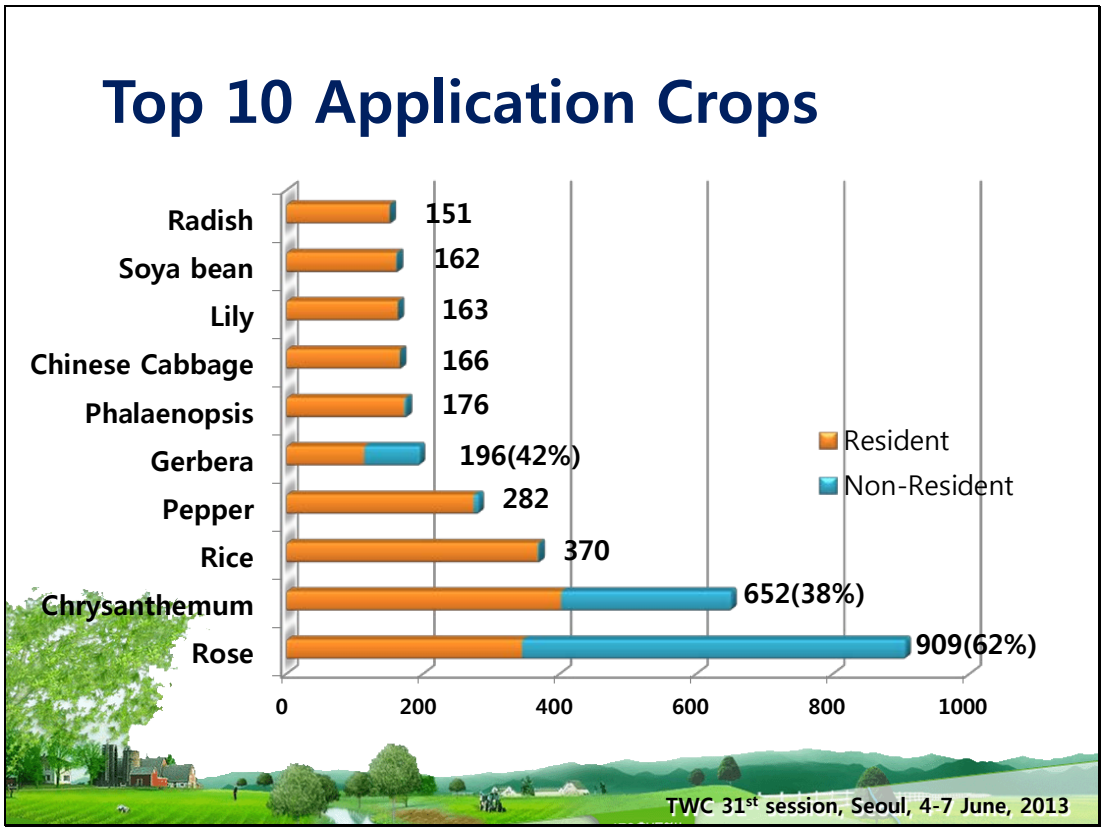
TWC 31st session, Seoul, 4-7 June, 2013

Registration by Applicants



TWC 31st session, Seoul, 4-7 June, 2013


Application by Non-Residents
Germany 10%
USA 6%
Denmark 5%
Italy 4%
Others 6%
Japan 31%
Netherlands 38%
TWC 31st session, Seoul, 4-7 June, 2013

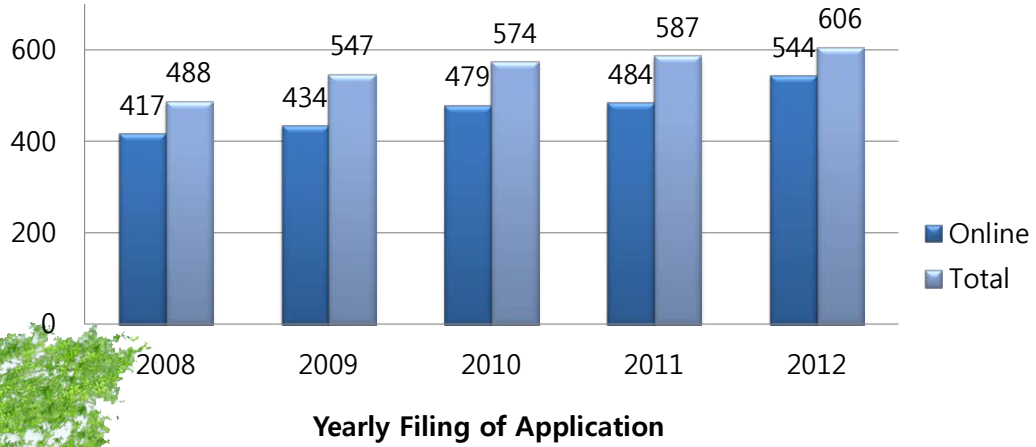

Top 10 Application Crops
Radish
Soya bean
Lily
Chinese Cabbage
Phalaenopsis
Gerbera
Pepper
Rice
Chrysanthemum
Rose
151
162
163
166
176
196(42%)
282
370
652(38%)
909(62%)
0
200
400
600
800
1000
Resident
Non-Resident
TWC 31st session, Seoul, 4-7 June, 2013

Introduction of KSVS Information System related to PVP

- Electronic Application System
- PVP Examination Aid System
  - Supporting examiner inspects Application and grants PVPR
- DUS trial Data Management System
  - Statistical Processing and Building Characteristics Database
- Electronic Document Management System
  - Keeping and Searching all Document related to Application

Electronic Application System

- Web-based online system (http://www.seednet.go.kr)
  - Applicant can access through Internet

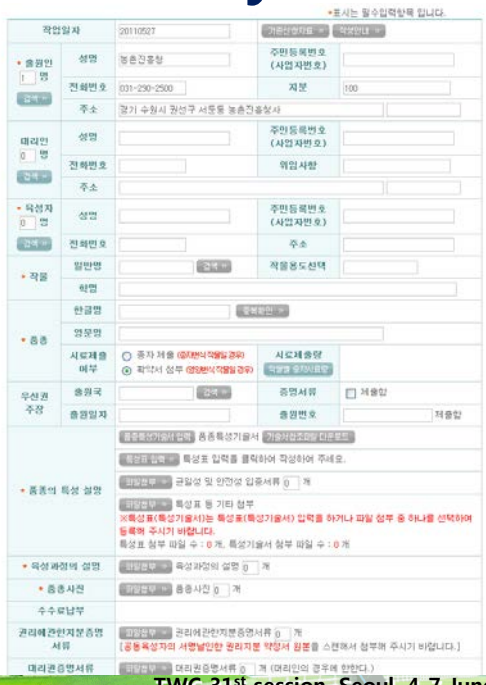


Yearly Filing of Application

Electronic Application System

① Permission of membership
② Log-in
③ Filling-in the application form
④ Attachment of additional files
⑤ Submission

Application Receipt



PVP Examination Aid System

- Web-based online system (for Examiner and Operation staff)

Examiner

① Making Decision Whether or not grant PVPR

② Checking Variety denomination

③ Writing Examination Report

④ Publishing Gazette

PVP Examination Aid System

- Web-based online system (for Examiner and Operation staff)

PVP Operation staff

① Registration and Issue of PVPR

② Notification and Recording

The payment of Registration / Annual fee

③ Cancellation of invalid PVPR

④ Keeping the Change of PVPR Manager or valid Right

DUS trial Data Management System

- Web-based online system (for DUS staff)

DUS staff

① Input DUS trial Data and statistical processing

② Searching for Characteristic Database

To find out comparison or reference variety

③ Writing DUS trial report

Electronic Document Management System

- Web-based online system

① Conversion to PDF format all document

- Application form(including attached files), Examination Report, DUS trial Report, Certification of PVPR and so on…

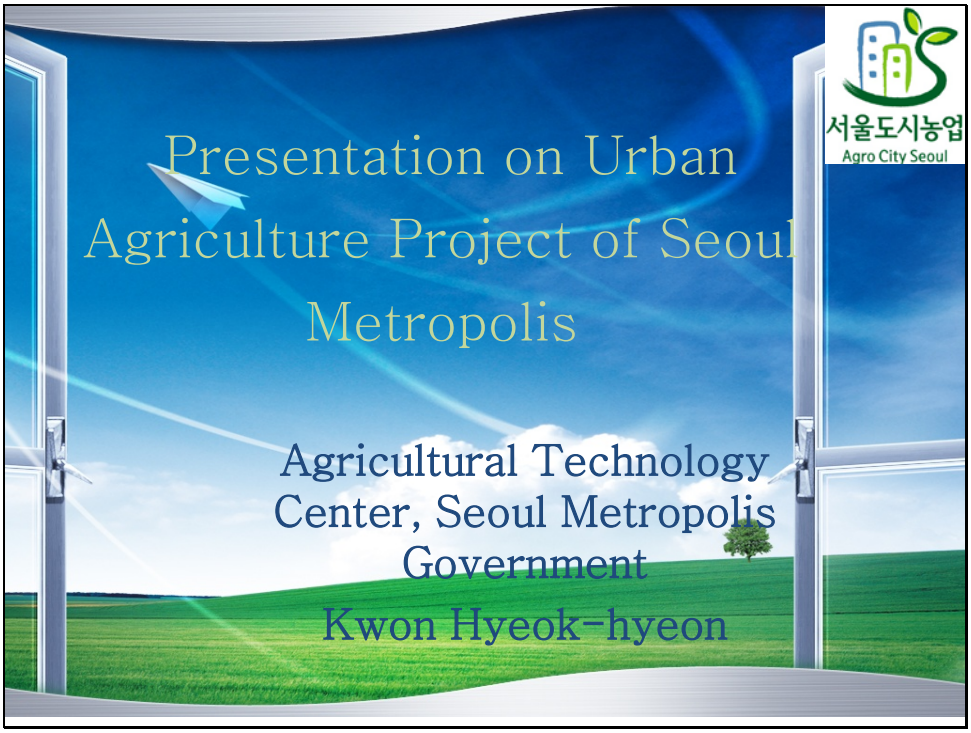
② Keeping Document Permanently

③ Searching Document by Variety Denomination, Application Number

Searching for Variety Image

- KSVS Homepage (http://www.seed.go.kr)

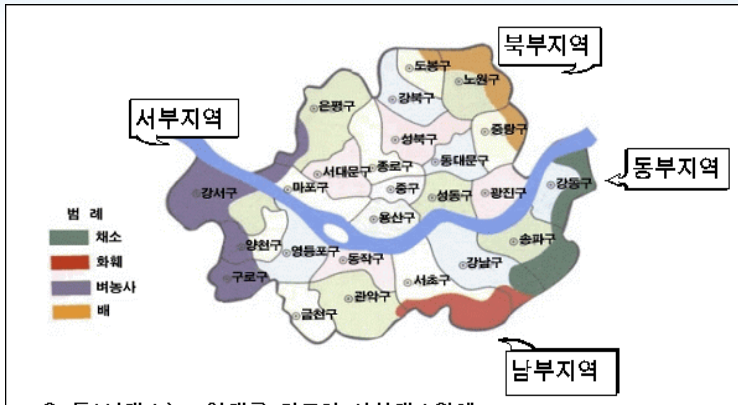
[Annex IV follows]


Presentation on Urban Agriculture Project of Seoul Metropolis
서울도시농업
Agro City Seoul
Agricultural Technology Center, Seoul Metropolis Government
Kwon Hyeok-hyeon


Presentation content
1 Vegetable garden with citizens
2 Educating citizens on agriculture within living
3 Rooftop garden dissemination cases
4 The 1st Seoul urban agriculture exhibition
5 Senior citizens job creation expo participation

1. Vegetable garden with citizens

Agricultural environment of Seoul



- 동부(채소) : 엽채류 위주의 시설채소원예
- 남부(화훼) : 관엽 중심의 화훼재배와 전국적인 꽃시장 형성
- 서부(쌀) : 쌀농사 적지로 경복궁 쌀 등 양질 미 생산·보급

1. Vegetable garden with citizens

Agricultural environment of Seoul

Background

- 82.2% of Seoul housing is apartment type without front yard and citizens are yearning for green color
- Empathy on LOHAS created in our society
- Rapid increase of senior citizen became social issue
- Various environment issues occur in society by the decrease in farming land due to urban development such as new town, Magok area and Bogeumjari housing
- Gardens utilizing idle space on rooftop is required to relieve heat island phenomenon in city-center

% change of 65 years old or higher senior citizens in Seoul

By year	2000	2005	2010	2020 (estimated)
Ratio (%)	5.3	7.1	9.1	14.9

1. Vegetable garden with citizens

Status of vegetable garden

Overview

- Object: 55 vegetable garden farms
- Quantity: 55 places with 15,421 lots (381,236㎡)
- Content: Make foundation such as convenience facilities, support environment-friendly agricultural material and others

Achievement

- Project basis and achievement
  - Started the concept of urban agriculture in vegetable garden farm in 1992 for the first time in Korea
  - Seoul Metropolis government enacted ordinance on fostering and support on environment-friendly agriculture and weekend experience farming (2007.07.30)
- Off-road parking for weekend farm in Farming and Fishing Village Maintenance Act has been revised to 600㎡ (2009. 12. 15)
- Rest area for weekend farm revised to 20㎡ (2010.7)

Vegetable garden farm status by year

year / item	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of farms	27	33	28	29	25	25	25	20	55	55
persons	6,530	11,940	11,200	7,239	8,477	8,170	9,000	6,927	13,483	15,421

1. Vegetable garden with citizens

Support on vegetable garden farms

1. Vegetable garden with citizens

Operation of silver vegetable garden

Contribute to creating sound living culture of senior citizens in aging society by providing them with works with which they can enjoy nature

Sowing in spring

Well grown vegetable garden

1. Vegetable garden with citizens

Operation of silver vegetable garden

- Recruitment of participants: Use senior citizen agencies (welfare center, senior association and others), individual recruitment, open recruitment through media

2. Educating citizens on agriculture within living

Urban farmer school

Expected effect

- Enhance awareness on agriculture and farming village, increase understanding on farming, direct dealing of agricultural products








2. Educating citizens on agriculture within living

Summer nature school for children



Natural dyeing experience

Mudfish catching experience

Wild flower observation and learning

Achievement by year

Items	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013 (plan)
Times	29	27	21	20	21	25	15	13	15	15
Persons	975	950	855	1,021	906	943	649	540	627	750

Questionnaire survey result with children who attended school (2012): Satisfied % (523 persons), So-so 3% (16 persons), not-satisfied 0.2% (1 person)

2. Educating citizens on agriculture within living

Nature experience class






2. Educating citizens on agriculture within living

Green tour education on urban consumers

- Make green tour farms: 4 places - one each for vegetable, fruits, floriculture and rice


- Status of green tour farms

Environment-friendly floriculture farm (Mindeulle Herb Garden)	Environment-friendly herb farm (Herb Daseotmae)	Environment-friendly pear tree farm (Pyeonghwa Farm)	Environment-friendly rice farm (Gwahae Farm)
• Location: Naegokdong, Seochogu • Size: 4,500 ㎡ • Content: - Cultivation and exhibition of herbs - Exhibition of 700 kinds wild flower pots - Received Minister of Agriculture & Forestry Award and other awards by wild flower pots	• Location: 446-8, Bangeedong, Songpagu • Size: 3,000 ㎡ • Content: - Observation and planting of herbs - Repotting of herbs - Herb tea experience	• Location: San 114-1, Junggyebondong, Jungranggu • Size: 23,100 ㎡ • Content: - Singo pear, Hwasan pear cultivation - Pear extract production and selling - Operate pear tree weekend farm	•Location: 518-2, Ogokdong, Gangseogu •Size: 10,000 ㎡ •Content: - Environment-friendly farming of rice - Farming by freshwater snail - Operate vegetable garden farm - Direct dealing of grains

2. Educating citizens on agriculture within living

Green tour on urban consumers

Expected effect

- Enhance awareness on agriculture and farming village, increase understanding on farming, direct dealing of agricultural products

2. Educating citizens on agriculture within living

Education on living in countryside

- Period: March to October 2013
- Participants: 400 persons in 8 sessions
- Expected effects: Earlier and successful settlement of people who want to live in countryside

2. Educating citizens on agriculture within living

Return to farming and establishment education

- Period: January to May
- Place: Agricultural Technology Center (5 days), Rural Development Administration, University of Agriculture and Fishery, research center (3 days), farmers house (9 days), crop market (1 day)
- Participants: 40 persons
- Expected effects: Prevent U-turn after return to farming. Help stable settlement as a farmer

2. Educating citizens on agriculture within living

Seasonal crops processing education

- Period: January to October 2013
- Participants: 800 persons in 10 sessions
- Expected effects: Publicizing the superiority of Korean crops and vitalizing crop consumption

2. Educating citizens on agriculture within living

Educating foreigners on traditional food

- Period: February to July 2013
- Participants: 400 persons in 6 sessions
- Expected effects: Publicizing the superiority of Korean food culture and support settlement of it


2. Educating citizens on agriculture within living

Traditional food education

- Period: January to November 2013
- Participants: 1,560 persons in 17 sessions
- Expected effects: Disseminate Korean traditional food cooking skill


2. Educating citizens on agriculture within living

Traditional living skill education

- Period: May to October 2013
- Participants: 300 persons in 6 sessions
- Expected effects: Understanding agriculture and disseminate traditional living skill

2. Educating citizens on agriculture within living

Green living home floriculture education

- Period: February to November 2013
- Participants: 1,500 persons in 35 sessions
- Expected effects: Contribute in dissemination of floriculture

3. Rooftop garden dissemination cases

Rooftop garden model project

- Prevent heat island in city-center by cultivating crops on idle space at rooftop
- Suggest new type green model by city-center green project

3. Rooftop garden dissemination cases

Utilization type 1

Private entity (AJ World)

(After installing rooftop garden)

3. Rooftop garden dissemination cases

Utilization type 2

- Kindergarten (Hannaedeul Kindergarten)


(Rooftop garden experience learning by kindergarten children)]

3. Rooftop garden dissemination cases

Utilization type 3

- Senior Welfare Center (Salvation Army Hongjedong Daycare Center)


(Senior citizens harvest crop and keep rooftop garden)

3. Rooftop garden dissemination cases

Rooftop garden by season

Spring

Autumn

Winter

3. 옥상텃밭 보급 사례

온도 경감효과

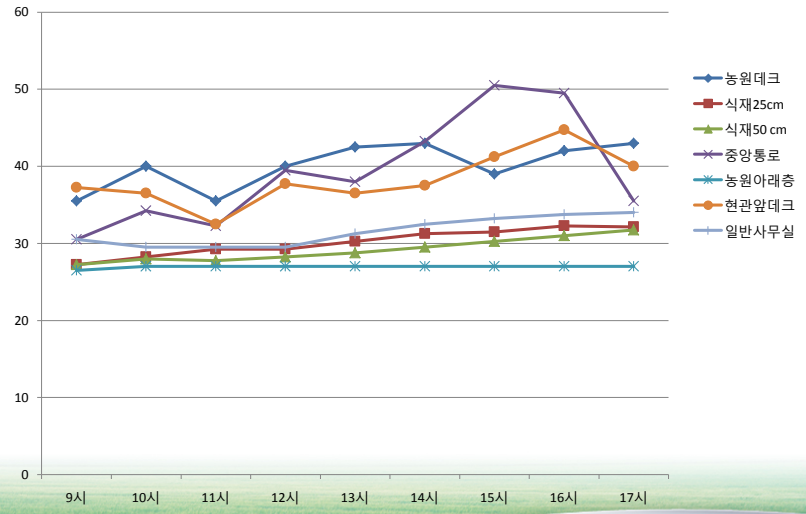
Location	Average temperature, ℃	Difference	Remark
Outdoor temperature (deck in front of porch)	37.2	-	
Vegetation 25cm	29.7	-7.5	
Vegetation 48cm	28.7	-8.5	
Central corridor	38.1	+0.9	
Rooftop deck	39.4	+2.2	
Floor below rooftop	27.0	-10.2	
General office	31.6	-5.6	

Reference

- Measurement period: August 17th to 20th 2013
- Measurement time: 9 a.m. to 5 p.m. (every hour on the hour)

3. Rooftop garden dissemination cases

Temperature relieving effect



4. The 1st Seoul urban agriculture exhibition

Exhibition hall of Agricultural Technology Center

Provide citizens with information on urban agriculture by operating a program and exhibition hall during the 1st Seoul urban agriculture exhibition

- Period: June 14th to 17th 2012
- Location: Seoul Metropolis City Hall Plaza
- Participants: 60,000 persons
- Exhibition booth: 5 ea (5*5 m)
- Exhibition halls
  - ☐ Hall 1: Vegetable garden model utilizing scrap space
  - ☐ Hall 2: Rooftop garden utilizing space for beginners
  - ☐ Hall 3: Rooftop orchard
  - ☐ Hall 4: Herb fragrance exhibition
  - ☐ Hall 5: Recycled material utilization exhibition
- Operation of experience exhibition hall
  - ☐ Egg yolk oil making
  - ☐ Useful microorganism making
  - ☐ Experience rice transplantation

4. The 1st Seoul urban agriculture exhibition

Agricultural Technology Center Exhibition hall

Front view of exhibition hall

Urban agriculture logo

Seoul map

Container cultivation

Garden fruit exhibits

4. The 1st Seoul urban agriculture exhibition

agriculture technique center exhibition

Urban orchard

Kitchen garden

Leaf vegetable exhibition hall

Bulbous vegetable exhibition hall

Garden fruit exhibition hall

4. The 1st Seoul urban agriculture exhibition

Agriculture experience hall

Egg yolk oil making experience

Moss ball making experience

Rice transplantation experience place

Rice transplantation experience

Moss ball making experience

5. Senior citizens job creation expo participation

Return to farming exhibition hall

Operate exhibition hall and experience hall during senior job creation expo to prepare for rapidly ongoing aging of society by expanding the society participation opportunity of senior citizens through return to farming

- Period: September 25th to 26th 2012
- Location: No. 1 exhibition hall of SETEC
- Participants: 1,670 persons (visit 1,220, experience/counseling 4 t50)
- Exhibition booth: Urban agriculture model exhibition (3*9m), experience booth (2*9m)
- Exhibition hall constitution
  - ☐ Concept: Making dining table healthy by various crops
  - ☐ Exhibition method: Produce vegetable garden by crops, which can be grown at home
  - ☐ Exhibit crops: Lettuce, water vegetable, turmeric
- Experience hall constitution
  - ☐ Concept: Purify indoor air by cultivating indoor plants
  - ☐ Experience: Making moss ball by bracken
  - ☐ Lecturer: 8 persons
  - ☐ Exhibit booth: 3 ea (1,800*800*800mm)

5. Senior citizens job creation expo participation

Return to farming exhibition hall

Special use crops exhibition hall

Garden fruit exhibition hall

Herb exhibition hall

Veranda fruit tree exhibition hall

Salad exhibition hall

5. Senior citizens job creation expo participation

Return to farming exhibition hall

5. 2012 urban agriculture publicizing

Publicizing

- Number of times: 260 times (citizen education (38), return to farming (48), rooftop (32), our food (23), vegetable garden (119))
- Media: KBS, MBC, SBS, YTN, Chosun, Dong-A, Jungang, Kukmin, Maeil Economy, Kyunghyang

5. 2012 urban agriculture publicizing

Publicizing

- Number of times: 260 times (citizen education (38), return to farming (48), rooftop (32), our food (23), vegetable garden (119))
- Media: KBS, MBC, SBS, YTN, Chosun, Dong-A, Jungang, Kukmin, Maeil Economy, Kyunghyang

6. Heonin floriculture complex status

- Heonin floriculture complex: 4 zones, 61 farmer houses, floriculture outlet and shipment area
- Major items: Foliage plants, flowers, ornamental trees, Western/Oriental orchids, cactus, fleshy plants, flower pots

6. Major cultivating crops in Heonin floriculture complex

Vegetable seedling

Geranium

Carnation

Bulbous plants

Wild flowers (Chinese geranium)

Chrysant hemum

Poinsettia

[End of Annex IV and of document]