



Available online at www.isas.org.in/jisas

**JOURNAL OF THE INDIAN SOCIETY OF
AGRICULTURAL STATISTICS 65(1) 2011 105-113**

**PERMISnet-II: Personnel Management Information System Network-II for the
Indian Council of Agricultural Research**

Mohammad Samir Farooqi, Alka Arora, Shashi Dahiya, Anil Rai and Balbir Singh
Indian Agricultural Statistics Research Institute, New Delhi

Received 19 June 2008; Revised 17 February 2010; Accepted 30 July 2010

SUMMARY

Personnel Management Information System Network (PERMISnet- II) has been designed for Indian Council of Agricultural Research (ICAR) using .NET technology. System is hosted at Indian Agricultural Statistics Research Institute (IASRI) web server and can be accessed through web address <http://permisnet/iasri.res.in>, using any web browser. System has been designed using modular approach and has separate modules for managers, general user, ICAR personnel and nodal officers of different Institutes. Nodal officers have the right to insert, edit/update and delete data related to their respective Institutes. Research Manager Personnel (RMP's) of ICAR have the flexibility to view reports at all levels, i.e. Institutional, Subject Matter Division (SMD) and consolidated for entire ICAR on different parameters. ICAR personnel have the right to view and download their bio-data.

Keywords: Personnel Management Information System, PERMISnet, PERMISnet II, ICAR, Manpower.

1. INTRODUCTION

Effective management of personnel in any organization is a crucial activity for the managers. This task becomes even more difficult when the organization is spread across whole country and the information needs to be collected from each of its centers. Information available in scattered form at different centers creates problem in decision making and is hindrance in taking appropriate measures at right time. Indian Council of Agriculture Research (ICAR) is an apex organization of National Agricultural Research System in India (NARS). ICAR has concurrent responsibility for both research and education. As an apex body at the national level, ICAR is mainly responsible for the promotion and co-ordination of agricultural research in the various branches of agricultural and allied sciences in the country. Research Manager Personnel (RMP's) have a huge and challenging task of efficiently managing its wide

network of ICAR personnel deployed across the length and breadth of the country. With the advances in Information Technology, consideration was given to the development of an online information system for personnel management which will assist in timely updating and availability of information.

Personnel Management Information System network (PERMISnet) for ICAR, an online information system for personnel management was earlier designed, developed and implemented at Indian Agricultural Statistics Research Institute (IASRI), using Microsoft Active Server Pages (ASP) technology [Dahiya *et al.* (2004), Arora *et al.* (2005) and Farooqi *et al.* (2005)]. System had the provision to capture information on different service categories of ICAR personnel including Scientific, Technical, Administrative and Finance-Accounts and Supporting staff on professional and personal parameters. The system also contained data on cadre strength and institutional parameters.

*Corresponding author : Mohammad Samir Farooqi
E-mail address : samir@iasri.res.in

PERMISnet system was extensively used by the top management of the ICAR. The management at the Institute and Council levels had appreciated the support provided by the system in taking timely decisions.

With the increasing demand for more decision support modules on human resource planning from the users of the PERMISnet system, need was felt to further strengthen and maintain the system on continuous basis. With the introduction of newer web technologies and platforms, it was felt that the system needs up gradation so that it remains compatible with the higher versions and latest upcoming web technologies. Thus, development of Personnel Management Information System II (PERMISnet-II) was initiated. PERMISnet-II has been designed and developed taking advantage of the .NET framework.

This paper is organized in three sections. Section 2 provides details on PERMISnet-II process model and database design. Section 3 deals with functionality and features available in PERMISnet-II system followed by conclusion in Section 4.

2. PERMISnet-II PROCESS MODEL

Many software development process models are available in literature. A process model for software is chosen based on the nature of project and application. Waterfall model is basic for any software development. This model suggests a systematic, sequential approach to software development that begins at the system level and progresses through requirement analysis, design, coding, testing and support. PERMISnet system was developed using Waterfall Model. Requirement analysis and design are two initial steps which needs to be addressed very carefully as they are the building blocks of any software. It is very difficult to have the exact requirement analysis ready at the beginning of the project as initially clients have abstract idea of the end result. This weakness of the process model is taken care by introducing iterative and incremental development process model in which software is developed incrementally for different modules. It starts with an initial planning and ends with deployment with the cyclic interaction in between. This gives the flexibility to the developer as well as client to incorporate the feed back in incremental development. Steps of iterative and

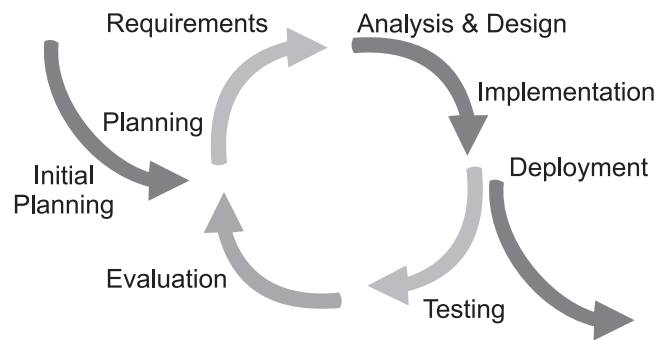


Fig. 1. Iterative development model

incremental process model are shown in Fig. 1. PERMISnet-II system is developed using iterative development model [Murlidhar *et al.* 1996].

2.1 Requirement Analysis

PERMISnet system was considered as prototype system in development of PERMISnet-II. User's feedback along with the functionality of the PERMISnet system was considered as initial requirement for PERMISnet-II.

2.2 Architecture and Design

Software design is a multistep process which focuses on four distinct attributes of a program, it includes data structure, software architecture, interface representation and procedural details. PERMISnet-II was designed as a web based application, which can be accessed for updating and reviewing from any node on the Internet through a web-browser (Jensen 2001, Lewis 1998, Blaya *et al.* 2007 and Arora *et al.* 2008). Standard three-tier client server architecture was used for the development of this web application. PERMISnet-II was different from its previous version as it was entirely a new system developed using .NET technology. ASP.NET programming framework was used for designing of user interface and coding of the business logic in the system.

2.2.1 System Design

PERMISnet-II system has been designed into different modules taking into consideration the large number of different categories of users. Mainly three categories of users have been identified, which include Nodal Officers (contact person for institute), RMP's and

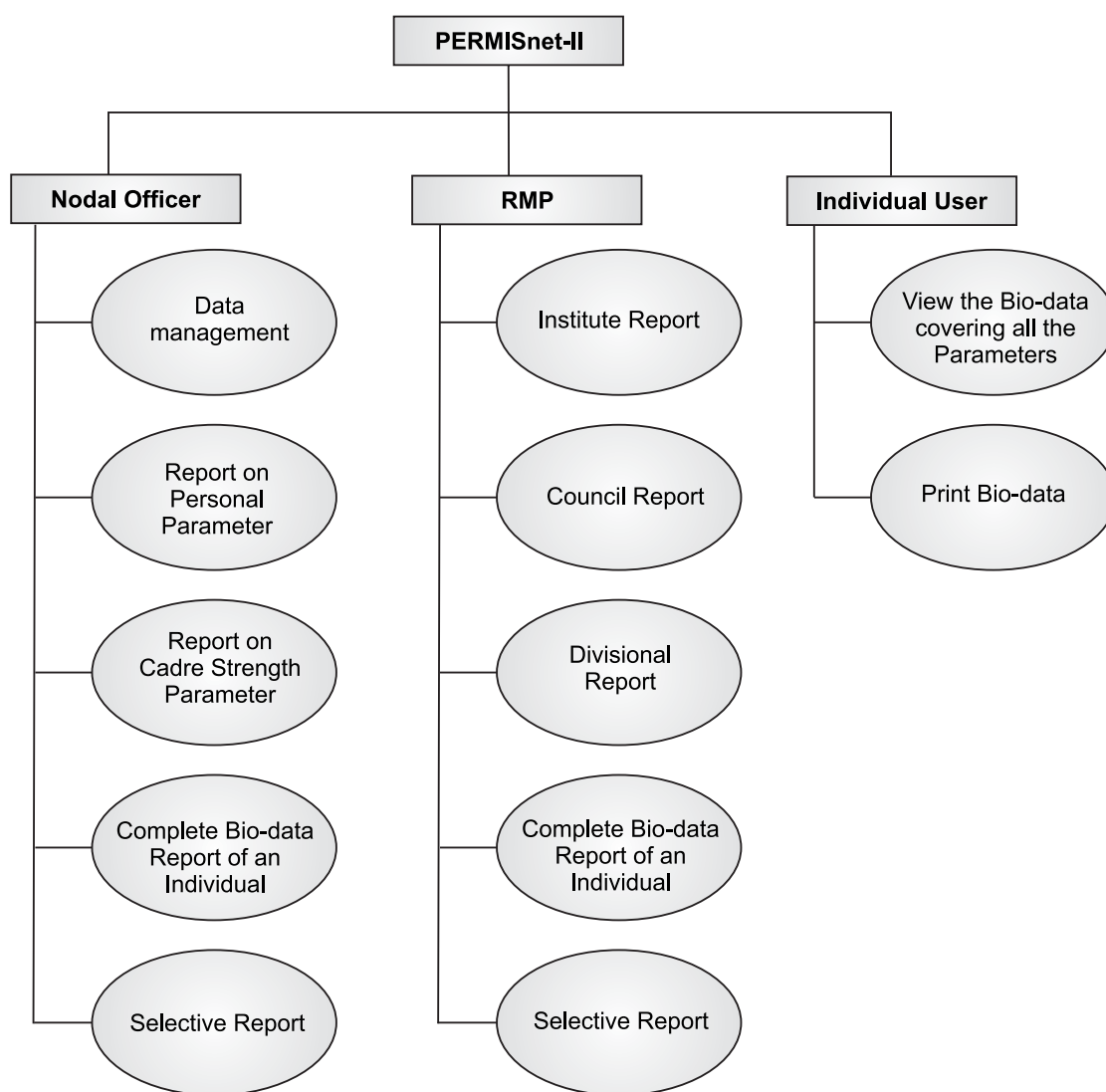


Fig. 2. Features in PERMISnet-II for different users

Individual users (ICAR Personnel). Different access rights have been provided to different types of users. Fig. 2 presents features available to different types of users. Apart from these users, general users have access to general reports on ICAR parameters.

2.2.2 Database Design

PERMISnet-II contains huge amount of data on personnel parameters; therefore, SQL Server was chosen for database management. The spectrum of the database comprises of database tables on different entities on personal parameters and the fields of the tables cover details of all attributes of the concerned parameter. A primary key in each table is identified for

uniquely defining a record. Similarly, the foreign keys were identified from other tables for setting relationship among different entities. Some of the tables were master tables, which were meant for providing the real world values to fields in different tables while building the queries and presenting the reports. A unique Employee code had been generated for all the personnel whose information gets entered into the system. Entity Relationship (ER) diagram of PERMISnet-II has been presented in Fig. 3. ER diagram shows the attributes on which data were collected along with relation with the personnel table (Elmasri *et al.* 1994, Sharma *et al.* 2006).

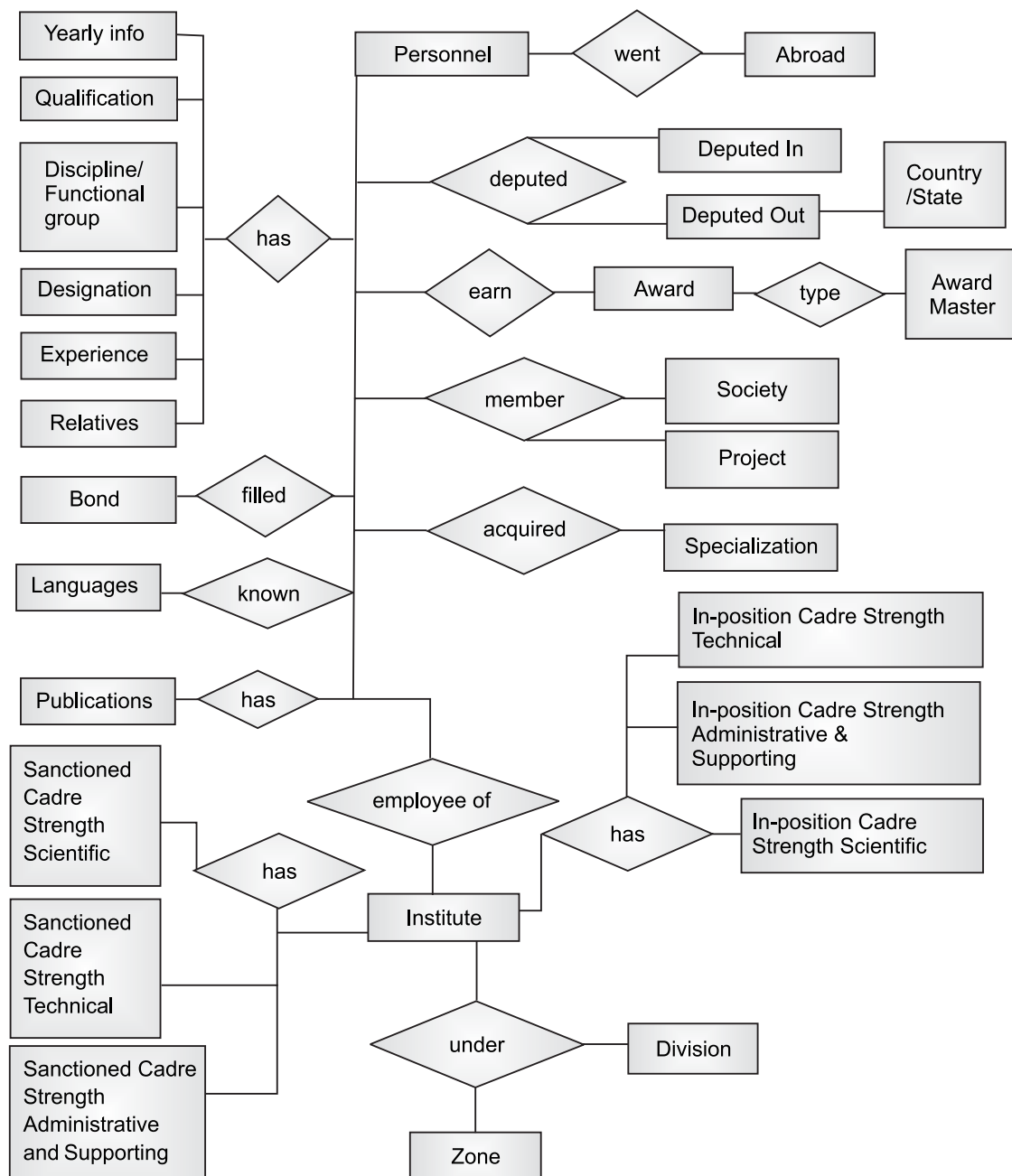


Fig. 3. Entity Relationship Diagram

2.3 Testing

Once the coding part is complete for a module then testing for the same is done. Testing focuses on the logical internals of the software, ensuring that all the logic is working correctly. Program testing for PERMISnet-II system was manually performed using the prototype data of IASRI institute. All the modules were thoroughly tested before deploying on the IASRI web site. Once the system was implemented and put to use, reported bugs by the users were fixed into

incremental development and deployment of the system.

2.4 Implementation and Deployment

PERMISnet-II system was successfully hosted at the IASRI, New Delhi's web server as it is equipped with the requisite hardware and bandwidth as well as associated infrastructure. Since the system was developed at IASRI, therefore it was easy to debug the system and carry out required changes. For effective

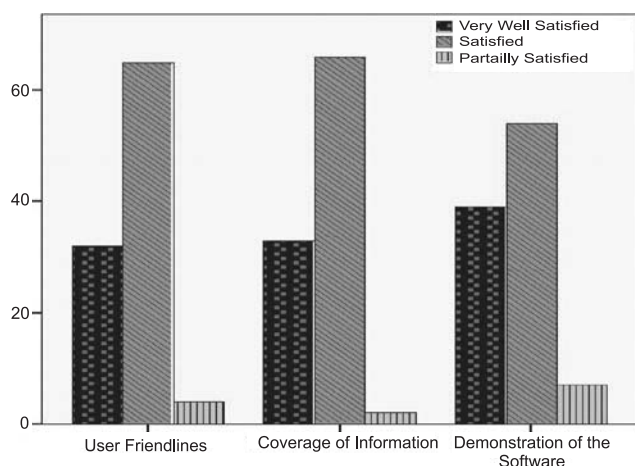


Fig. 4. Users feedback on PERMISnet-II

implementation of the system, managers at Council level had taken the responsibility and nodal officers from each of the ICAR institutes were identified and given the responsibility of adding and updating the data of the employees of their institutes. Apart from nodal officers for each of the ICAR institutes, one central nodal officer was identified at IASRI so that feedback and bugs can be reported directly. Implementation and post implementation workshops were held on annual basis during which nodal officers were trained in handling the system and also appraised of their responsibilities for collection and updating of records. Feedback from these workshops and regular interaction with the nodal officer formed the basis for further enhancement of the system.

Launch workshop for PERMISnet-II was organized, in which the nodal officers from all the ICAR Institutes and officials at ICAR headquarter participated. Complete demonstration of the system was given in the workshop, and at the end of the workshop, feedback from the participants were collected. Response by the users on user friendliness, coverage and demonstration of the system were analyzed and the user response is graphically depicted in Fig. 4.

3. FUNCTIONALITY OF PERMISnet-II

PERMISnet-II was designed to cater different types of users. Home page of the system is depicted in Fig. 5. After authentication, users have been provided different features depending upon their category [Fig. 2].

- General User: any user visiting the system can access the general reports.
- Individual User: scientific category personnel of ICAR can view their personal and professional parameters through their bio-data reports.
- Nodal Officers: can access the data of their institute for adding, viewing and editing personal, professional and cadre strength information.
- RMP's can view the reports at all levels.

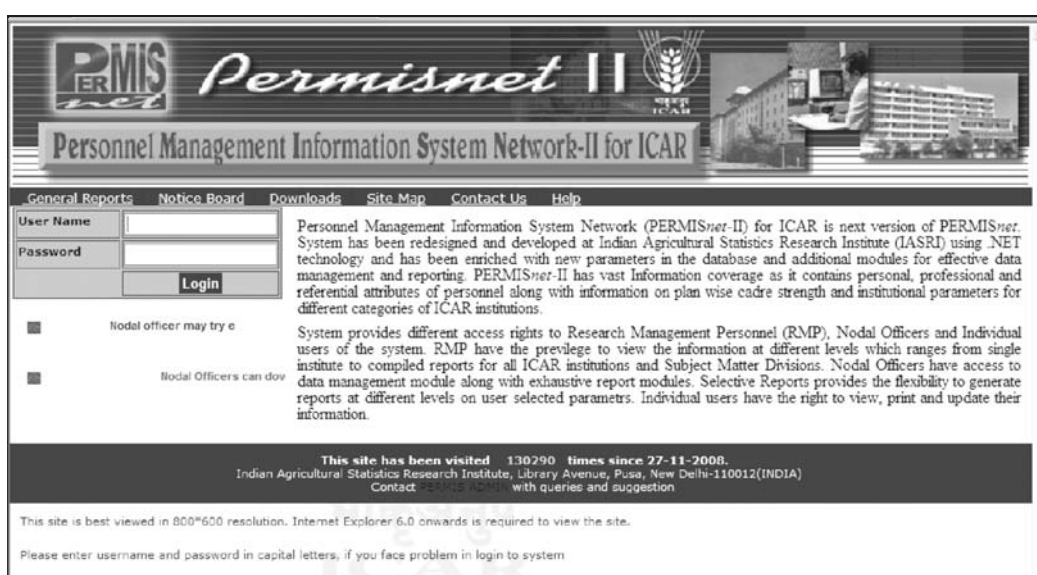


Fig. 5. Home Page of PERMISnet-II

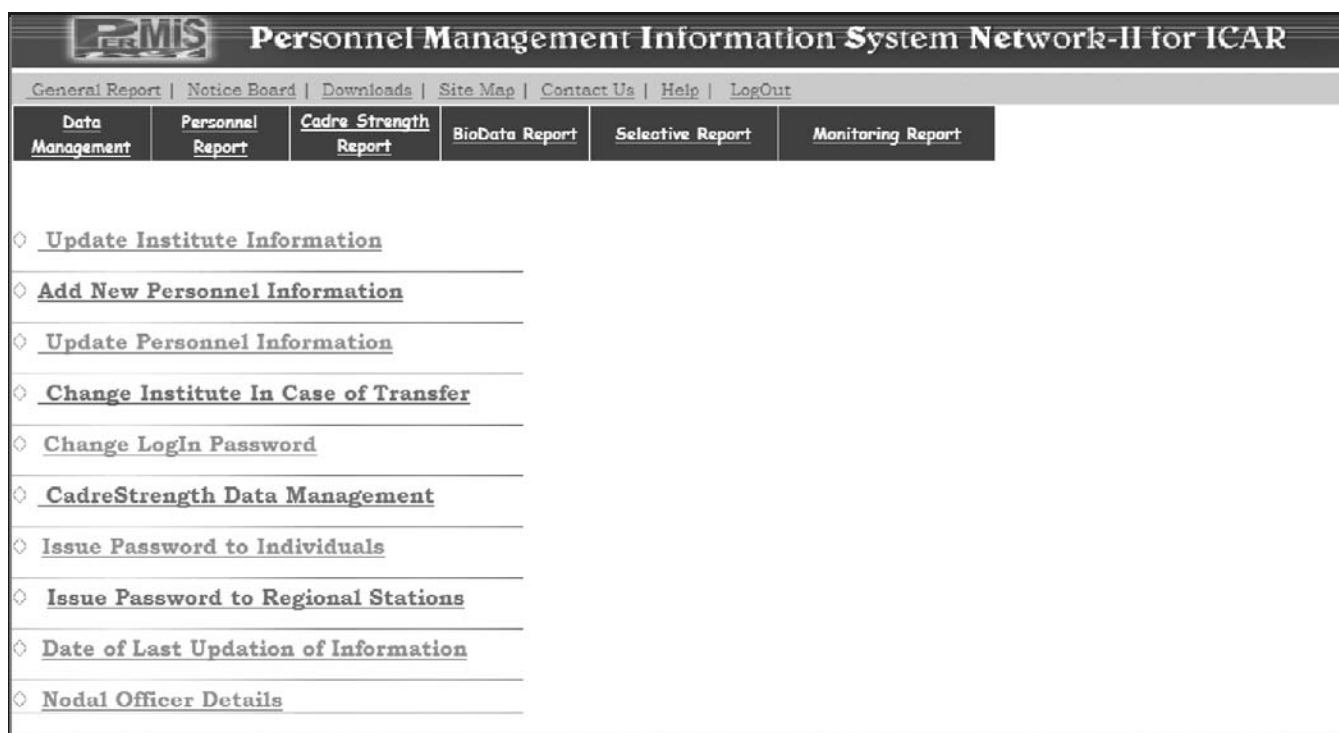


Fig. 6. Reports and Data Management options page for Nodal Officers

3.1. Data Management

Data management module is accessible to nodal officers for viewing and editing the data corresponding to their respective institutes after authentication. The Data Management module of PERMISnet-II handles the data entry, and data modification tasks of personal and organizational parameters, online. It also handles the transfer of data of ICAR personnel from one institute to other when they get transferred. Nodal officer's information and change of password options are also provided under this module. Administrator has the sole power of entering/updating master forms, which are meant for entering the real time values of some entities. Apart from the administrator, nodal officers from institutes have been authorized to enter/modify the data related to the employees of their institute. Data management option for nodal officer is depicted in Fig. 6.

3.2 Management Reports

This module provides variety of options for generating management reports for different user groups. Some major reports of PERMISnet-II are summarized here:

- RMP report module provides information to RMP's of the ICAR at different levels of abstractions which includes reports at Institute level, Summarized reports at Subject Matter Division (SMD) and Council level and the bio-data reports of the ICAR personnel.
- Institute level report provides information about personnel of that institute on parameters such as
 - Cadre strength
 - Sex, caste category, religion, etc.
 - Reports on professional parameters such as abroad visit made by an employee, experience, age, trainings, awards etc.
 - Personnel retiring between a given period.
- User customized reports for RMP's and Nodal officers to generate reports of their interest. Users have been given the flexibility to choose parameters of their choice and generate the report. Sample report has been depicted in Fig's. 7(a), 7(b) and 7(c).

Personnel Management Information System Network-II for ICAR

General Report | Notice Board | Downloads | Site Map | Contact Us | Help | Logout

Service Type: Scientist

* Designation: --Select--
Asstt. Director General

* Discipline / Functional Group: --Select--
Agricultural Chemistry

* Category: --Select--
General

Emp-Status: --Select--

Experience: From Year --Select--

Sex: Female

Qualification: --Select--

* Religion: --Select--
Buddhist

Award: --Select--

Age: From Year 30 To Year 40

Retiring Between: From Month --Select-- Year --Select--
To Month --Select-- Year --Select--

Abroad Visits: Purpose --Select-- Country --Select--

The fields with '*' have the facility of multiple selection

View Report

Fig. 7(a). Page 1 of Selective Report

Personnel Management Information System Network-II for ICAR

Please select the parameters to view the report :

Name Date of Joining Country

Designation Date of Retirement Date of Return

Age Date of Birth Date of going Abroad

Address Spouse/Husband Name

Category Religion

VIEW REPORT

Fig. 7(b). Page 2 of Selective Report

Personnel Management Information System Network-II for ICAR

Print

Report on the basis of ---Age Between '30' AND '40' , Service Type = 'Scientist' , Sex = 'Female'

Main Institute
Indian Agricultural Statistics Research Institute

Sr. No.	Name	Designation	Age	Date of Joining	Date of Retirement	Date of Birth
1	Dr Cini Varghese	Sr.Scientist	38	Jun 10 1998	Apr 30 2034	Apr 22 1972
2	Ms Alka Arora	Scientist S.G	36	Nov 27 1997	Oct 31 2035	Oct 27 1973
3	Dr Prachi Misra Sahoo	Scientist S.S	39	Aug 9 2000	Aug 31 2032	Aug 16 1970
4	Ms Anshu Bhardwaj	Scientist S.S	38	Nov 17 1999	Jan 31 2034	Jan 14 1972
5	Ms Sangeeta Ahuja	Scientist S.S	35	Oct 27 1999	Oct 31 2036	Oct 19 1974
6	Ms Shashi Dahiya	Scientist S.S	36	Aug 25 1998	Jul 31 2035	Jul 24 1973
7	Smt Anu Sharma	Scientist S.S	34	Nov 18 1999	Aug 31 2037	Aug 9 1975

Fig. 7(c). Report on selected Parameters

- Bio-data reports of ICAR employees to view and print their personal and professional details (Fig. 8).
- General reports are accessible to all the categories of users. It covers basic information about ICAR like institutional structure, list and addresses of ICAR institutes, list and addresses of the directors of the ICAR institutes, institutes in difficult area, etc.
- Cadre Strength reports at Institute level, SMD and Council level such as
 - Plan wise Sanctioned Strength
 - Current year In-position Strength
 - Gaps in Cadre Strength
 - Year wise In-position Strength
- Monitoring reports to check regular updating of the data as being performed by nodal officers of the institutes [Fig. 9].

4. CONCLUSION

The RMP's of the ICAR are faced with the challenging task of efficiently managing its wide network of human resources, making projections and catering to the personal and professional needs of its

The screenshot displays the 'Personnel Management Information System Network-II for ICAR' interface. At the top, there is a navigation menu with links for 'General Report', 'Notice Board', 'Downloads', 'Site Map', 'Contact Us', 'Help', and 'Logout'. Below the menu, there are two buttons: 'Print Complete Bio-Data' and 'Change Password'. The main content area shows a profile for 'Sh. MOHAMMAD SAMIR FAROOQI' with a small portrait photo. To the right of the photo, there is a list of links for 'Personnel and Contact Detail', 'ICAR and Current Joining Detail', 'Professional Details', 'Family, Qualification and Experience Detail', 'Specilization, Bond, Training, Project and Deputation', 'Teaching & Training, Award, Patent, Membership and publication', and 'Leaves, Language Known and Visit Abroad'.

Fig. 8. Bio-data report of an employee

The screenshot displays the 'Personnel Management Information System Network-II for ICAR' interface. At the top, there is a navigation menu with links for 'General Report', 'Notice Board', 'Downloads', 'Site Map', 'Contact Us', 'Help', and 'Logout'. Below the menu, the title 'Central Sheep & Wool Research Institute' is prominently displayed. Underneath the title, there are two date fields: 'FromDate' (28/12/2009) and 'ToDate' (18/06/2010), with a 'Print' button to the right. A table with four columns is shown below: 'UserName', 'EmployeeName', 'LoginTime1', and 'Logintime2'. The table contains four rows of data. At the bottom of the table, there is a 'Back' button.

UserName	EmployeeName	LoginTime1	Logintime2
drsorkum	Dr SURESHKUMAR S	06/02/2010 15:59:00	10/02/2010 19:58:00
solankimr	Mr MEVA RAM SOLANKI	18/01/2010 15:56:00	19/01/2010 13:58:00
jangidjijn	Mr MADAN LAL JANGID	16/01/2010 14:40:00	
drvedagb	Dr Ved Prakash	05/02/2010 16:21:00	

Fig. 9. Institute wise monitoring report

employees deployed across the country. In order to provide accurate information of its employees instantly to the RMP's for systematic planning and management of human resources in ICAR, PERMISnet-II has been developed. PERMISnet-II system being online and regular updates by nodal officers, has made it effective tool for decision making. Use of .NET technology in development has provided enhanced security features and user-friendliness to the system. Further modular approach and different access rights to different categories of users have resulted in customized and easy access to the information. Successful implementation of this system has provided policy makers more liberties to glance at manpower planning, policy decisions and skill banks. Continuous updating and addition of new reports and modules in the system will go a long way in providing improved decision support to RMP's and Nodal Officers of the ICAR.

ACKNOWLEDGEMENT

The authors are thankful to all the nodal officers of PERMISnet at ICAR institutions for their contribution in successful implementation of this system. Authors also thank referee for giving valuable suggestions that helped in improving the quality of this paper.

REFERENCES

- Arora, A., Sharma, S.D., Malhotra, P.K. and Goyal, R.C. (2008). Agricultural Statistician Network (ASN). *J. Ind. Soc. Agril. Statist.*, **62(1)**, 49-55.
- Arora, A., Singh, B., Dahiya, S. and Farooqi, M.S. (2005). Planning and distribution of manpower of ICAR using PERMISnet. *J. Ind. Soc. Agril. Statist.*, **59(2)**, 141-145.
- Blaya, J.A., Shin, S.S., Yagui, M.J.A., Yale, G., Suarez, C. Z., Asencios, L., Cegielski, J.P., Fraser, H.S.F. (2007). A web-based laboratory information system to improve quality of care of tuberculosis patients in Peru: Functional requirements, implementation and usage statistics. *BMC Medical Informatics and Decision Making*, **7(33)**, 1-11.
- Dahiya, S., Singh, B., Arora, A. and Farooqi, M.S. (2004). Web based Personnel Management Information System for Indian Council of Agricultural Research (ICAR). *J. Ind. Soc. Agril. Statist.*, **58(2)**, 244-252.
- Farooqi, M.S., Singh, B., Arora, A., Dahiya, S. (2005). PERMISnet: e-solution for ICAR. *Agric. Ext. Rev.*, **17(3)**, 3-5.
- Jensen, A.L. (2001). Building a web-based information system for variety selection in field crops – Objectives and results. *Comput. Electron. Agric.*, **32**, 195-211.
- Lewis, T. (1998). Evolution of farm management information systems. *Comput. Electron. Agric.*, **19**, 233-248.
- Murlidhar, U. and Rama Rao, D. (1996). Management Information System - AGRUNIS: Experiences and issues in Indian context. *J. Inform. Sci.*, **22(4)**, 277-286.
- Elmasri, R., Navathe, S.B. (1994). *Fundamentals of Database Systems*. 6th edition, Addison-Wesley Longman Publishing Co., Inc. Boston, MA, USA.
- Sharma, A., Goyal, R.C., Gupta, V.H. and Grover, R.B. (2006). Design and on-line management of database on Indian Agricultural Education System. *J. Ind. Soc. Agril. Statist.*, **60(3)**, 155-161.