

Planning and Distribution of ICAR Manpower through Personnel Management Information System (PERMISnet)

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SUMMARY

This web based information system is developed for Personnel Management in Indian Council of Agricultural Research (ICAR). ICAR has vast institutional structure spread across length and breadth of the country and has got huge manpower to carry out its activities. This on line Personnel Management Information System (PERMISnet) is developed to meet the Human Resource Management and Development (HRMD) need of ICAR. It is divided into two main modules: Data management and Report module. Data management module deals with the on-line data entry and updating of manpower data. Report module provides a platform for communication on information related to manpower, to all the ICAR institutions and to the management group of all levels i.e. managerial, operational and transactional level to support in decision-making. The technologies used in developing the system are the latest in the field. Active Server Pages are used for server side programming, Hyper Text Markup Language (HTML) and VBScript is used for client side interface and validation and SQL Server 7.0 is used for database management.

The paper aims in providing information on institutional framework and working force of the Council. It provides facts and figures on distribution of different types of institutes and manpower distribution in different service types. It provides distribution of scientific manpower under ARS disciplines and projections for the personnel in a particular time frame are also assessed, based on that timely action can be initiated for filling up the gaps. It provides percentage distribution of manpower in different disciplines of that Subject Matter Division (SMD).

Key words: ARS disciplines, PERMISnet, MIS, Information system, ICAR and Subject Matter Division (SMD), Personnel management.

1. INTRODUCTION

Managers are faced with the problem of efficient and effective management of their research. The most important resources used for management of research include people, finance and facilities. Availability of relevant information on these parameters is essential prerequisite for sound decision making because they provide the basis for effective planning, monitoring and evaluation of the research. Management Information System (MIS) plays a major role in providing the desired information in appropriate report format to the managers. MIS refers to the set of interrelated components comprising people, activities and information technology

that function together to supply the relevant information. With the advent of the information technology online MIS are gaining popularity as they provide timely and reliable information to help the managers in monitoring and planning the resources in order to come up with policy level decisions. Human Resource Management Information Systems are integral part of MIS and it refers to the manpower inventory. It contains various kind of information on personnel like qualification and career background, place of work, projects, publications, training, accomplishments etc. Management need this information for recruitment, career development planning and for performance appraisal of their employees.

Indian Council of Agricultural Research (ICAR) is an apex organization of agriculture research and development in the country. It has 34,000 employees working in different institutions spread across length and breadth of the country. Considering the large setup of Council (Fig. 1) and its manpower effective management of such a vast manpower poses a formidable challenge to the Council. Therefore the thought of human resource information system was conceived and as a result the Personnel Management Information System Network (PERMISnet) for ICAR came into existence.

PERMISnet system is developed under the institute project "Development of Software for Online Information System on Personnel Management in ICAR" in the Division of Computer Applications of IASRI. This online information system provides information about manpower in ICAR and is hosted from IASRI domain at the address <http://www.iasri.res.in/permisnet>.

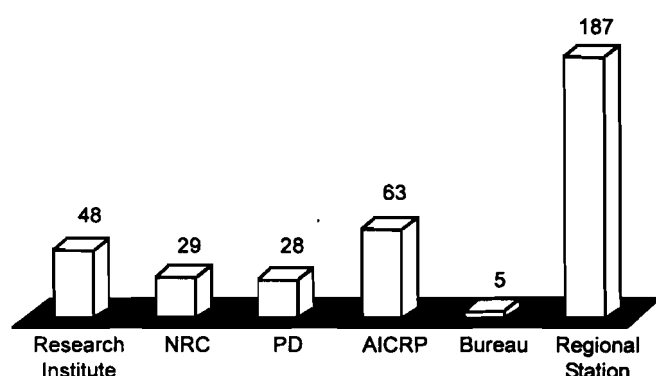


Fig.1. Institutional structure of the Council

This paper aims in providing information on architecture and design of PERMISnet system. Paper discusses key features of the reports generated from the system to support the managers at all the levels. It supports the claim of PERMISnet system as a tool for managers for effective and efficient management of manpower with the help of few examples. Examples are taken from the Council level reports and subject matter divisional reports. Example 1 provides distribution of scientific manpower under ARS disciplines and projections for the personnel in a particular time frame are also assessed, based on that timely action can be initiated for filling up the gaps. Example 2 provide facts and figures on manpower distribution under different service types. Example 3 provides percentage

distribution of manpower in different disciplines of that Subject Matter Division.

2. DESIGN AND DEVELOPMENT OF PERMISnet

2.1 Architecture

A three-tier architecture is considered to be the most suitable architecture for large, web-based enterprise applications. The partitioning of the application enables rapid design and development of the system. The modularity makes it easier to make changes to just one tier without affecting the others. Separating the functions into distinct tiers makes it easier to monitor and optimize the performance of each layer. Load balancing and adding more capacity can take place independently at each layer.

Tier 1 - Presentation layer: Presentation Layer of this system is basically web pages or graphical user interface through which user interacts. It consists of reports and forms required to present the information to the user and to take the input from the user. This layer is implemented using HTML, JavaScript and VBScript. Session management is performed within this tier. For more complex applications that involve multiple interactions between the user and application, the routing decisions and storage of intermediate state information is also performed within Tier 1.

Tier 2 - Business logic layer: It contains business logic and operation that application performs on data. These are programs that interact with the database directly. For PERMISnet system Business Logic Layer is implemented using Microsoft Active Server Pages (ASP) installed on Internet Information Server (IIS) web server at Windows NT server. ASP has many advantages like it has support for other web servers too like Personal Web Server (PWS) at windows 9X. ASP is server side scripting environment used to create dynamic web pages on a base of HTML or XML markup. ASP supports variety of web technologies, including the VBScript and Jscript scripting language, ActiveX Data Object (ADO) for connectivity to database and server side objects. ASP makes it easier to enable database transactions using Structured Query Language (SQL) as compared to other parallel technologies like Common Gateway Interface (CGI) scripts.

Tier 3 - Database layer: For implementation of Data Base Layer relational database technology is extensively used for developing information system. The main strength of a relational database is simple data models and flexibility for future changes. Relational Data Base Management System (RDBMS) offers the benefits of independence of physical data storage and logical database structure, variable and easy access to all data, complete flexibility in database design, reduced data storage and redundancy, and easier to maintain. Database layer for this system is built using Microsoft SQL Server 7.0 that is an enterprise-class database designed to support the new generation of web-based applications. ASP/ADO is used for integrating Tier 3 with the Business Logic Layer. ADO provides consistent, high performance access to data.

2.2 Design of PERMISnet

An information system for strategic planning is more elusive than other systems therefore certain degree of structure is a prerequisite for developing such information systems. Information coverage in PERMISnet system is vast and it contains information on cadre strength and institutional parameters for different institute types. Personal, Professional and Referential attributes of personnel that range from personal details, their experience, and research to yearly information that is filled by personnel. While designing the system hierarchical approach is used and personnel are categorized according to their service type (Scientist, Technical, Administration & Supporting) and then service status (Regular, Retired, Consultant, Contractual and Deputed employees). Then further Scientists are distributed according to Ag. Disciplines under 8 Subject Matter Divisions of ICAR, Technical services under 9 Functional Groups and Administrative and Supporting personnel are distributed in central pool and Institute strength. This approach is used keeping in mind that attributes covered are large in number and all the attributes are not relevant for all service type and status. Personnel attributes on which data collected are Personal details, Qualification, Project, Publication, Specialization, Experience, Training, Awards won, Abroad visits, Relatives, Deputation, Language known, Bond, Leave and Yearly Information to be filled by personnel at the institute level. Attributes collected regarding Institute are its general details, sanctioned and existing cadre strength.

System is designed into two main modules i.e. Data Management and Management Reports. Data management module deals with organization of data and report module provide information on collected parameters to managers at different levels. Keeping in view the security and consistency of data, system has got limited access to only the authorized users and these are authenticated nodal officers at the institute level. Nodal officers have privileges to add, update and view the information. Nodal officers update the information on the regular basis and implementation of the system has reached almost at the completion stage. Nodal officer at IASRI and at ICAR Headquarter is responsible for overall monitoring, updating and maintenance of the system.

3. RESULTS AND DISCUSSION

Management Reports is specifically designed so as to cater the day-to-day information requirement of managers of the ICAR at all levels i.e. managerial, operational and transactional level to support in decision-making. As the system caters to the information need of managers of institute, SMD and ICAR levels therefore management reports are further divided into sub modules for these levels of managements. Sub modules under Management Reports are Individual level reports, Institute level reports, Divisional (SMD) level reports, ICAR level reports and User Customized reports. User customized report gives users the flexibility of generating reports based on parameters chosen at run time.

Key features of the reports generated by the system are :

- Brief and detailed bio-data of personnel covering its professional attributes
- Consolidated reports of staff strength, gaps in position
- List of personnel on deputation, having won awards and special achievements
- Personnel visited abroad for different purpose
- List of personnel on the basis of sex, category
- List of personnel who will be retired in specified time period
- Personnel whose promotion is due

- Personnel whose status is temporary or permanent
- Personnel working in difficult area
- User Customized reports has the advantage of generating reports based on the criteria chosen by the user. For example reports like list of personnel with chosen area of specialization or commodity. List of personnel visited abroad for different reasons
- Date of last modification report, which is monitoring report to check the status of regular updating of data

Apart from these reports generated by the system, in this paper we have compiled some information generated from reports module of Subject matter divisions, Council level and User customized report. Our major focuses on the examples taken are on information generated for cadre strength and distribution of manpower under different service types.

Example 1 : It shows the distribution of manpower into different service types (Fig. 2). This information is generated from the system using ICAR level report module. Graph reveals that manpower distribution under scientific, technical, and administrative & supporting services are 14%, 30% and 56%.

Example 2 : Subject Matter Division report module gives the distribution of scientific manpower in different disciplines under that particular subject matter division. Some disciplines are major disciplines and some are supporting and allied disciplines in that SMD. Information about major and allied disciplines of that particular SMD is taken from ICAR publication (Sharma (1997)). Fig. 3 shows the distribution of scientists in different disciplines under Animal Science Division. Results shows that disciplines contributing major role are Animal Genetics & Breeding, Animal Nutrition, Veterinary Microbiology, Live Stock Production & Management and Bio Chemistry (Animal Science). Among supporting and allied disciplines major contributing disciplines are Ag. Economics, Ag. Statistics and Ag. Extension. Ag. Economics is playing major role among allied disciplines as institute NCAP being part of the Animal Science Division.

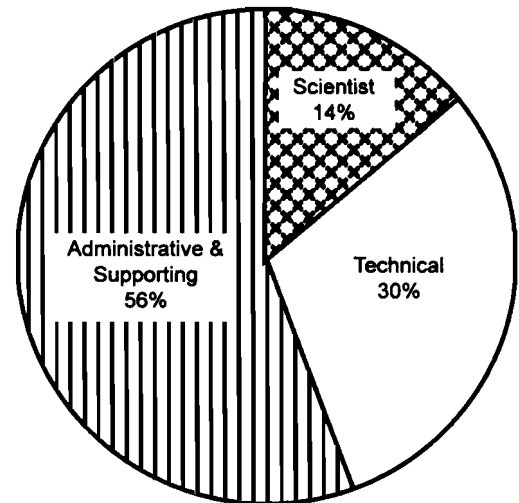


Fig. 2. Distribution of ICAR manpower

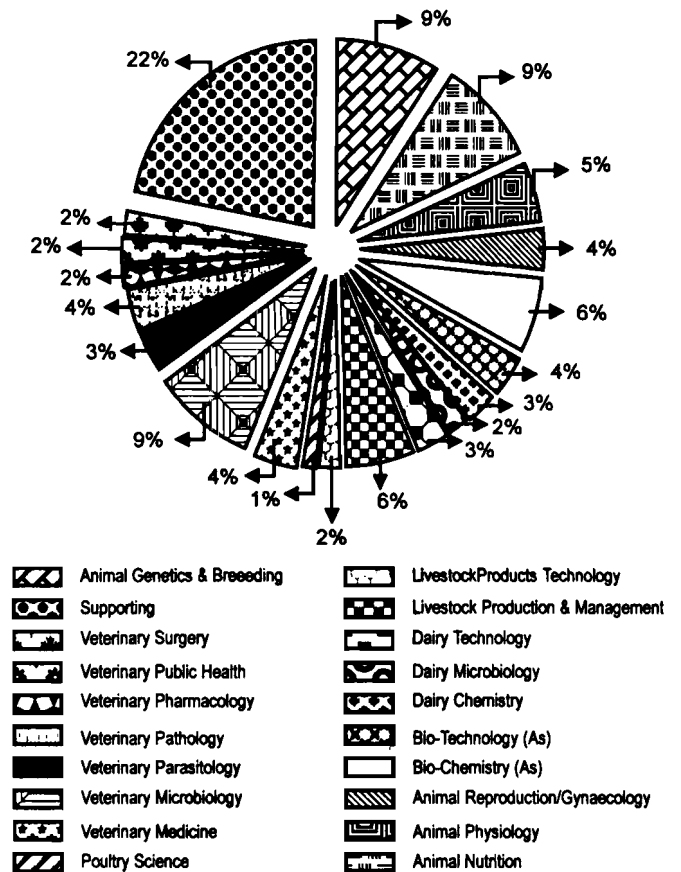


Fig. 3. Disciplinewise distribution of scientists in Animal Science

Fig. 4 reveals the distribution of manpower in Ag. Engineering Division. Major contributing disciplines in this division are Farm Machinery & Power and Process Engineering. Rests of the major disciplines in this particular division are contributing less than 5%.

Interestingly supporting and allied disciplines are contributing more than 50% in this division. Among allied disciplines Ag. Statistics alone is contributing 24% and Computer Application is contributing 7% and this is due to the institute IASRI coming under this division.

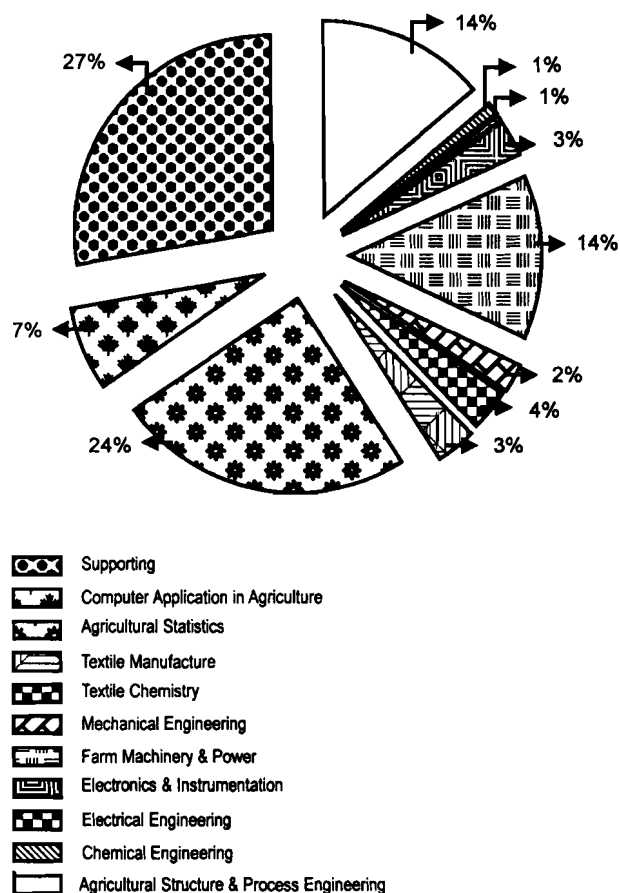


Fig. 4. Discipline-wise distribution of scientists in Agricultural Engineering

Example 3 : System provides information on distribution of scientific manpower under ARS disciplines. ICAR level report module gives information on sanctioned and in-position scientific manpower distribution in different disciplines. Some analysis has been done on the information from the database to calculate the projections for the personnel retiring by year 2007. Likewise the information on sanctioned and in position cadre strength and projection of the personnel after retirement by year 2007 has also been obtained. These figures reveal that by 2005 we have reached half of the total strength as was sanctioned in 1997. Results further show that almost 10% of the present position of the scientists will be retired in next two years. This is

further important in view of the Council's decision of extending retirement age of scientists by 62. Based on the above results timely action could be initiated for filling up the gaps.

4. CONCLUSION

Personnel Management Information System covers all the information related to ICAR personnel institutions, which is required for any organization for effective human resource development and management. System is user friendly and being online it provides timely information to managers at all level. Results from the examples show the need for filling up the gaps, restructuring of disciplines in the subject matter divisions and distribution of manpower under different service types. Examples support the claim that system will act as a decision making tool for ICAR. Structural approach has provided more potential to the system and its implementation can be applied to whole National Agricultural Research System (NARS) and that will make the data bank more meaningful and strong.

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REFERENCES

Balaguru, T., Manikandan, P., Kalla, C.J. (1996). *Management Information System for Agricultural Research*. National Academy of Agricultural Research Management, Rajendernagar, Hyderabad.

Dahiya, S., Singh, B., Arora, A., 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. (2004). Efficient Human Resource Management in ICAR through Information Technology. *Farming System Research, Extended Summary Volume*, 235-237.

Sharma, R.D. (1997). *Cadre Strength of ICAR Institutes for Agricultural Research Scientists*. Indian Council of Agricultural Research, New Delhi.