

Chapter 5

Analysis of Reproductive Health and Nutrition Group Institutes

5.0 List of institutes under Reproductive Health and Nutrition group

1. National Institute for Research in Reproductive Health (NIRRH), **MUMBAI**
2. National Institute of Nutrition (NIN), **HYDERABAD**
3. National Centre for Laboratory Animal Science (NCLAS), **HYDERABAD**
4. Food and Drug Toxicology Research Centre (FDTRC), **HYDERABAD**
5. Regional Medical Research Centre, **JABALPUR**

The data from the following institutes/labs has not been received:

1. Regional Medical Research Centre, **JABALPUR**

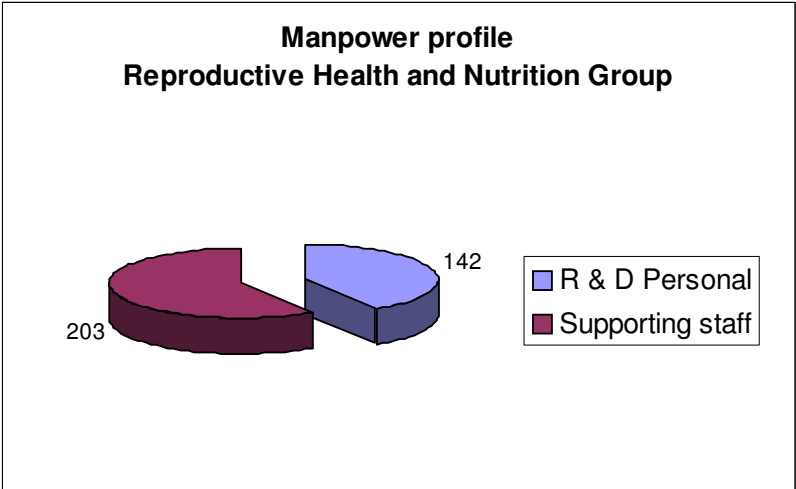
Moreover, the National Institute of Nutrition (NIN), HYDERABAD, National Centre for Laboratory Animal Science (NCLAS), HYDERABAD & Food and Drug Toxicology Research Centre (FDTRC)], HYDERABAD is considered as one institute /lab for analysis purpose.

5.1 Overall analysis of institutes under the Reproductive Health and Nutrition group

5.1.1 Manpower Profile

The five institutes categorized in the Reproductive Health and Nutrition group cover varied areas of research. The figure 5.1 below presents the manpower profile in terms of R&D personal and supporting staff of the 4 institutes/labs of Reproductive Health and Nutrition group out of a total of 5 who have supplied the data.

Figure 5.1



5.1.2 Core Competency wise Manpower of the Reproductive Health and Nutrition group are given in Table 5.1

Table -5.1

Reproductive Health and Nutrition group				
Core Competency wise Manpower of various Institutes				
S. No.	Name of laboratory	Area of Core Competency	Manpower (in Numbers)	
			R&D Personal	Supporting Staff
1.	National Institute for Research in Reproductive Health (NIRRH), MUMBAI	Expanding Contraceptive choices	13	20
		Infertility & Reproductive Disorders	14	10
		Menopause& Osteoporosis	6	7
		Reproductive Tract Infections	6	10
		Maternal & Child Health	5	11
		Adolescent Reproductive health	5	3
		Genetic Disorder	1	5
		Structural Biology	2	4
		Stem Cell Biology	2	1
2.	National Institute of Nutrition (NIN) [Including NCLAS & FDTRC], HYDERABAD	Division of Field Studies	11	21
		Behavioral Sciences	4	6
		Clinical Division	10	0
		Microbiology	2	6
		Micronutrients	2	4
		Isotope unit	3	3
		Sports Nutrition	1	2
		Endocrinology	11	1
		Stem Cell Research	3	0
		Nutrition and Eye Research	2	1
		Molecular Biology	3	10
		Pathology	2	3
		Flurosis	0	2
		Lipid Chemistry	8	14
		FDTRC	8	22
		Extension and Training	6	4
NCLAS	5	9		
PCT	6	24		
	Total	142	203	

5.1.3 Major R&D facilities of the Reproductive Health and Nutrition group are given in Table 5.2

Table -5.2

Reproductive Health and Nutrition group			
Major R&D facilities of various Institutes			
S. No.	Name of laboratory	Area of Core Competency	Facilities
1.	National Institute for Research in Reproductive Health (NIRRH), MUMBAI	Expanding Contraceptive choices	Proteomics work station, Radio immunoassay, Flow-Cytometry PCR and Real time PCR Electrophoresis and software Micro array Workstation, Polscope, Molecular Biology and Immuno Diagnostic techniques, Cryopreservation of reproductive tissue, Reproductive toxicology, Transgenic animals, animal house facility, family planning, genetic diagnosis, colposcopy, semenology, stem cell research, bioinformatics, 2-D electrophoresis and software, DNA sequencing facility.
		Infertility & Reproductive Disorders	
		Menopause & Osteoporosis	
		Reproductive Tract Infections	
		Maternal & Child Health	
		Adolescent Reproductive health	
		Genetic Disorder	
		Structural Biology	
		Stem Cell Biology	
2.	National Institute of Nutrition (NIN) [Including NCLAS & FDTRC], HYDERABAD	Division of Field Studies	Facilities for providing training in health and nutritional status Statistical analysis, data interpretation and report writing Estimation of hemoglobin
		Clinical Division	Studies on bone health using DEXA Nutrition in women and children
		Microbiology	<i>Sexually transmitted infections</i> 1. Detection of NG/CT by TMA assay 2. HIV, HSV2 3. Syphilis and bacterial cultures <i>Immunological parameters</i>
		Micronutrients	Bioavailability of micronutrients Food fortification

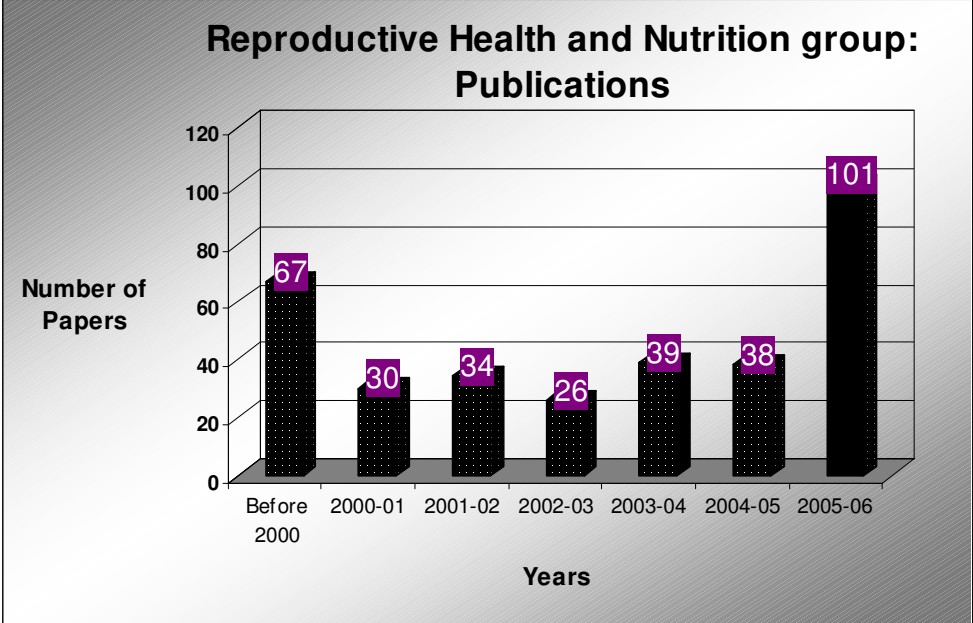
	Isotope unit	Iodized salt, iron fortified salt, iron and iodine fortified salt Testing kit for iodine in salt Testing kit for iron in salt Iron and iodine fortified sugar Radioisotope studies including RIA
	Sports Nutrition	Energy metabolism & body composition Exercise physiology Obesity & weight management Sports nutrition
	Endocrinology	Energy metabolism & body composition Exercise physiology Obesity & weight management Sports nutrition
	Stem Cell Research	Stem cell Flagship project
	Nutrition and Eye Research	Structural studies Functional foods
	Molecular Biology	Molecular biology of degenerative diseases Global gene expression profiles Identification and molecular characterization of GM foods Gene and nutrient interactions
	Pathology	Services Research
	FDTRC (Food & Drug Toxicology Research Centre)	Preclinical toxicology Cancer epidemiology Food safety including mycotoxin testing lab
	Extension and Training	Nutrition Extension and Communication Annual Training Programmes
	NCLAS (National Centre for Laboratory Animal Science)	Animal Breeding and Genetics Animal Nutrition and supply of experimental animal feed Health monitoring and perimatology Animal Physiology

		PCT	<p>Safety evaluation (regulatory pre-clinical toxicology) of biotech products (drugs and foods)</p> <p>Safety evaluation (regulatory pre-clinical toxicology) of traditional preparations (Ayurveda, Unani) neutraceuticals</p> <p>Efficacy evaluation and validation of products having therapeutic potentials</p>
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5.1.4 Papers

The following figure 5.2 represents the total number of papers published by the 4 institutes/labs out of 5 institutes in the Reproductive Health and Nutrition group from 2000 to 2006.

Figure 5.2



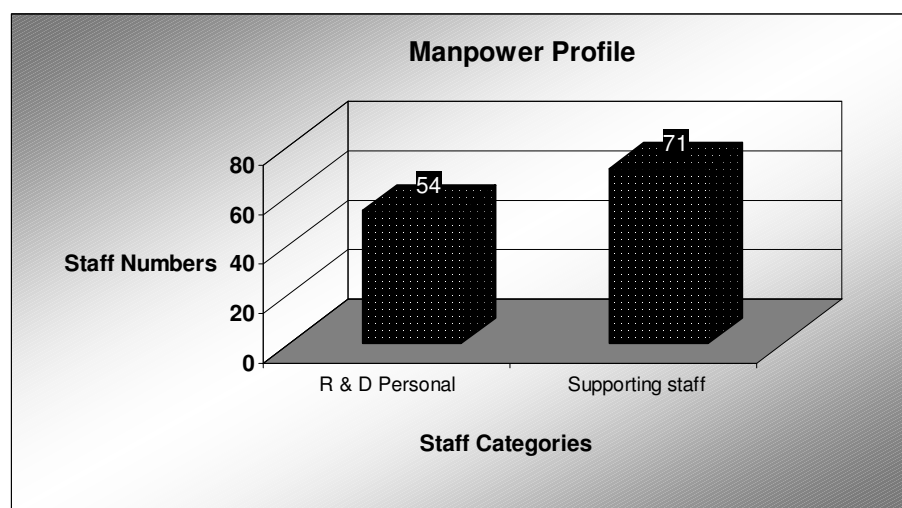
5.2 Analysis of individual institutes under the Reproductive Health and Nutrition group

5.2.1. National Institute for Research in Reproductive Health (NIRRH), MUMBAI

5.2.1.1. Manpower profile

The following figure 5.3 depicts the manpower profile of NIRRH

Figure 5.3



5.2.1.2. Areas of Core Competency

The following Table 5.3 gives the available manpower data in the identified areas of core competency of the institute.

Table 5.3

S.No	Area	Manpower (Nos.)	
		R & D Personal	Support staff
1.	Expanding Contraceptive choices	13	20
2.	Infertility & Reproductive Disorders	14	10
3.	Menopause & Osteoporosis	6	7
4.	Reproductive Tract Infections	6	10
5.	Maternal & Child Health	5	11
6.	Adolescent Reproductive health	5	3
7.	Genetic Disorder	1	5
8.	Structural Biology	2	4
9.	Stem Cell Biology	2	1

5.2.1.3. Major R & D facilities

NIRRH has identified the following as their major R&D facilities:

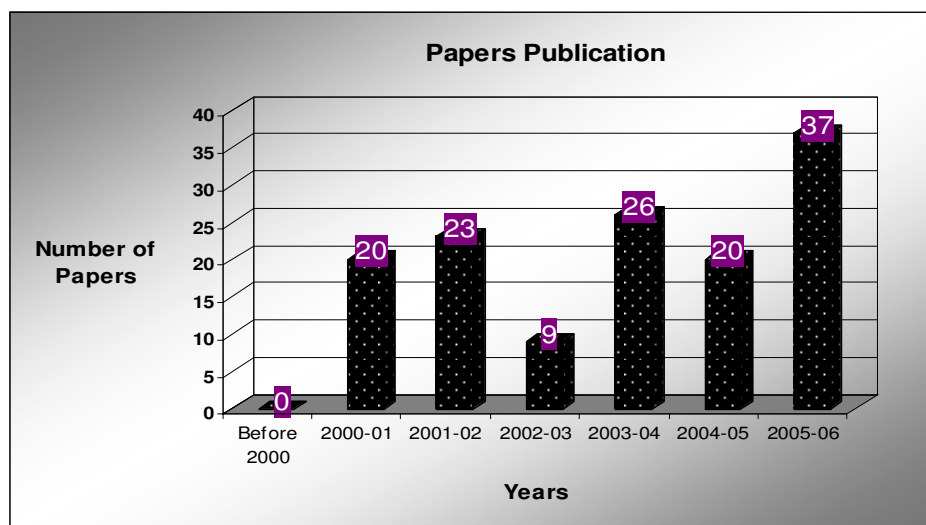
S.No	Area	Facilities
1.	Expanding Contraceptive choices	Proteomics work station, Radio immunoassay, Flow-Cytometry PCR and Real time PCR Electrophoresis and software Micro array Workstation, Polscope, Molecular Biology and Immuno Diagnostic techniques, Cryopreservation of reproductive tissue, Reproductive toxicology, Transgenic animals, animal house facility, family planning, genetic diagnosis, colposcopy, semenology, stem cell research, bioinformatics, 2-D electrophoresis and software, DNA sequencing facility.
2.	Infertility & Reproductive Disorders	
3.	Menopause & Osteoporosis	
4.	Reproductive Tract Infections	
5.	Maternal & Child Health	
6.	Adolescent Reproductive health	
7.	Genetic Disorder	
8.	Structural Biology	
9.	Stem Cell Biology	

5.2.1.4. Number of collaborations/ Affiliations – 25/1

5.2.1.5. Papers

The following figure 5.4 gives the details of the number of papers published by NIRRH during 2000 and 2006:

Figure 5.4



(For details about the publications of NIRRH, refer institute website)

5.2.1.6. National / International Accreditations

The NIRRH has recognized following accreditations:

1. Accredited to the University of Mumbai for M.Sc and PH.D programs in the areas of biochemistry, applied biology and life sciences.

5.2.1.7. National / International Certification

The NIRRH has recognized following certifications:

1. WHO collaborating centre for research in reproductive health.

5.2.1.8. Potential Exportable R & D services

NIRRH has identified the following as their potential exportable R&D services:

1. Testing
2. Contract Research
3. Specialized facilities / services

5.2.2. National Institute of Nutrition (NIN)[Including NCLAS & FDTRC], HYDERABAD

National Institute of Nutrition (NIN) was founded by Sir Robert Mc Carrison in the year 1918 as 'Beri-Beri' Enquiry Unit in a single room laboratory at the Pasteur Institute, Coonoor, Tamil Nadu. Within a short span of seven years, this unit blossomed into a "Deficiency Disease Enquiry" and later in 1928, emerged as full-fledged "Nutrition Research Laboratories" (NRL) with Dr. McCarrison as its first Director. It was shifted to Hyderabad in 1958.

NIN has attained global recognition for its pioneering studies on various aspects of nutrition research, with special reference to protein energy malnutrition (PEM). Institute's activities are broad-based, encompassing the whole area of food and nutrition. The Institute has achieved close integration in its research activities between the laboratory, the clinic and the community.

The emphasis shifted to problem-oriented research, with a view to discovering practical solutions to nutrition problems that can be applied within the existing socio-economic framework. National Institute of Nutrition, over the eighty years of

glorious service to the nation, has to its credit an impressive record of achievements in the amelioration of several nutritional disorders of our people.

The Institute has been recognized by many national and international agencies as Centre for conducting advanced as well as ad-hoc training courses in nutrition and laboratory animal sciences. In addition, several reputed universities have recognized NIN as a Centre for Ph.D programmes in different disciplines.

It possesses sophisticated equipment and well-equipped modern facilities and for clinical, laboratory and community based research. Nutrition Wards with adequate inpatient and outpatient facilities are available at hospitals viz., Niloufer Hospital for Women and Children, Government Maternity Hospital and Osmania General Hospital to carry out research in clinical nutrition.

The Institute's library, well stocked with books and journals is considered as one of the best science libraries in India. In addition, computer facilities are available for sophisticated data analysis and information retrieval from database.

The "Nutrition Museum" of the institute is an important teaching tool which highlights different aspects of food and nutrition and also covers the work undertaken at the Institute.

National Centre for Laboratory Animal Science (NCLAS)

The National Centre for Laboratory Animal Sciences was set up with the aim of producing quality laboratory animals for experimental purposes. The centre was known as the Laboratory Animals Information Service (LAIS) prior to 1976, had its modest beginning in 1957 in Bombay, with the financial support from UNESCO.

In 1959, the Centre was taken over by ICMR and later in 1976, it was shifted to the premises of National Institute of Nutrition (NIN), Hyderabad. At this juncture, the Centre was renamed as Laboratory Animal Information Service Centre (LAISC). It expanded its activities and started breeding and supplying laboratory animals to various Institutions in the country. In 1988 with the financial support from ICMR and Department of Biotechnology, the services of LAISC were considerably improved through the establishment of a National Infrastructure

Facility for Laboratory Animals (NIFLA). In the year 1995, the two centres, viz., LAISC and NIFLA were merged into a single unit and re-christened as the National Centre for Laboratory Animal Sciences (NCLAS). The center is currently meeting the breeding and experimentation needs of over 180 institutions in the country. Apart from breeding and supplying of animals, the center regularly undertakes quality control of laboratory animal feed and checks the health and genetic background of laboratory animals under its care.

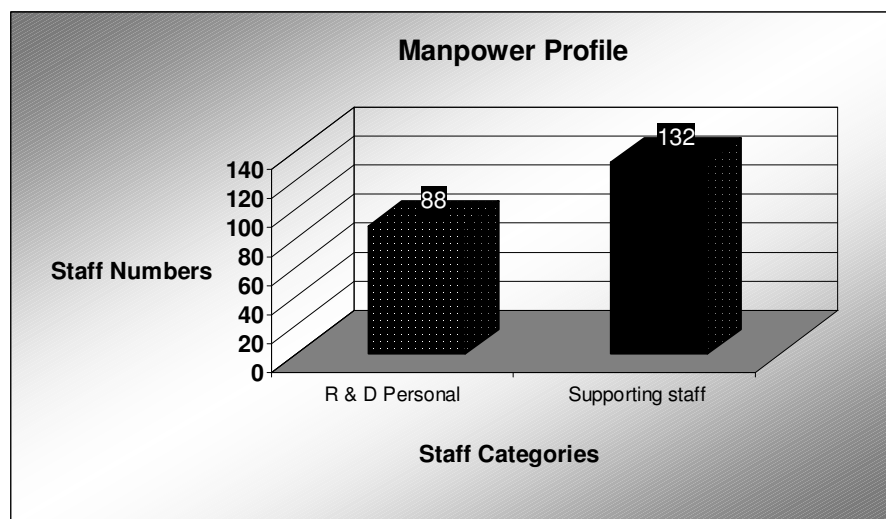
Food and Drug Toxicology Research Centre (FDTRC)

Recognizing the significant contributions made by the Institute in the field of food toxins, the Food & Drug Toxicology Research Centre (FDTRC) was established in the year 1978 to investigate food borne disease outbreaks and for toxicological evaluation of foods and drugs. FDTRC, located at NIN, is a major national centre for research in fungal toxins, pesticide residues, food additives, heavy metals, pharmacokinetics and nutrient-drug interactions. The Centre is also engaged in environmental monitoring as well as biomonitoring to study human exposures to carcinogens/toxins in the environment and their biological impact. This centre shares certain essential facilities like equipment, library etc., with NIN.

5.2.2.1. Manpower profile

The following figure 5.5 shows the manpower profile of NIN, FDTRC and NCLAS.

Figure 5.5



5.2.2.2. Areas of Core Competency

The following Table 5.4 gives available manpower in each of the areas of core competency of the institute.

Table 5.4

S.No	Area of Core Competency	Manpower (No.s)	
		R & D Personal	Support staff
1.	Division of Field Studies <ol style="list-style-type: none"> 1. Operational Research 2. Clinical Trials 3. Evaluation of National Nutritional Programmes 4. Training in assessment of health and nutritional status 	11	21
2.	Behavioural Sciences <ol style="list-style-type: none"> 1. Psychosocial indicators 2. Behavioral assessments 3. Rapid assessment and ethnography 4. Child development 	1 1 1 1	2 2 0 2
3.	Clinical Division <ol style="list-style-type: none"> 1. Bone mineral density measurements in adults/children 2. Bone health 3. Nutritional rehabilitation of children 4. Nutrition in pregnancy 	2 4 2 2	0 0 0 0
4.	Microbiology <ol style="list-style-type: none"> 1. Sexually transmitted infections (N.Gonorrhoea, C.Trachometis) HSV2, HIV, Syphilis 2. Immune response and allergenicity 	1 1	4 2

S.No	Area of Core Competency	Manpower (No.s)	
		R & D Personal	Support staff
5.	Micronutrients 1. Food fortification 2. Bioavailability of micronutrients	2 0	4 0
6.	Isotope unit 1. Salt, sugar fortification with micronutrients 2. Salt testing kit 3. Radioisotope services	1 1 1	1 1 1
7.	Sports Nutrition 1. Energy metabolism & body composition in human population 2. Exercise physiology 3. Obesity & weight management 4. Sports nutrition	0 1 0 0	0 2 0 0
8.	Endocrinology 1. Foetal programming for adult diseases 2. Health beneficial effects of plant foods 3. Brain insulin signaling and adiposity 4. Micronutrients and apoptosis 5. Blood brain barrier function	2 4 1 2 2	1 0 0 0 0
9.	Stem Cell Research 1. Stem cell in relation to micronutrients/ diabetes 2. Flagship project	2 1	0 0
10.	Nutrition and Eye Research 1. Structure – function aspects of protein in health and disease 2. Functional foods	2 0	1 0
11.	Molecular Biology 1. Molecular biology of degenerative diseases 2. Global gene expression profiles 3. Identification and molecular characterization of GM foods 4. Gene and nutrient interactions	3 0 0 0	10 0 0 0

S.No	Area of Core Competency	Manpower (No.s)	
		R & D Personal	Support staff
12.	Pathology 1. Pathology services 2. Research	2 0	3 0
13.	Fluorosis 1. Fluoride toxicity 2. Fluorosis mitigation 3. Defluoridation	0 0 0	0 2 0
14.	Lipid Chemistry 1. Nutritional biochemistry – special reference to obesity & lipoprotein metabolism 2. Lipid biochemistry 3. Molecular biology	3 3 2	7 7 0
15.	FDTRC 1. Clinical biochemistry 2. Cancer epidemiology 3. Preclinical toxicology 4. Food safety	2 2 2 2	3 2 12 5
16.	Extension and Training 1. Nutrition Extension and Communication 2. Human Resource Development	6 0	4 0
17.	NCLAS 1. Laboratory animal breeding & genetics 2. Animal nutrition and supply of experimental animal feed 3. Laboratory animal health monitoring and primatology 4. Laboratory animal physiology	2 1 1 1	5 2 1 1
18.	PCT Safety evaluation of indigenously developed products (drugs and foods) by recombinant technology	6	24

5.2.2.3. Major R& D facilities

The following table 5.5 shows the major R&D facilities of NIN, FDTRC & NCLAS:

Table 5.5

S.No	Area	Facilities
1.	<p>Division of Field studies</p> <ol style="list-style-type: none"> 1. Facilities for providing training in health and nutritional status 2. Statistical analysis, data interpretation and report writing 3. Estimation of hemoglobin 	<p>Trained personnel and anthropometry equipment</p> <p>Different statistical packages and data base packages available for performing statistical analysis</p> <p>Trained personnel and photoelectrical calorimeter</p>
2.	<p>Clinical studies</p> <ol style="list-style-type: none"> 1. Studies on bone health using DEXA 2. Nutrition in women and children 	<p>DEXA and HPLC for vit. D measurement</p> <p>Clinical facilities Lab facilities for estimation of biochemical parameters</p>
3.	<p>Microbiology</p> <p><i>Sexually transmitted infections</i></p> <ol style="list-style-type: none"> 1. Detection of NG/CT by TMA assay 2. HIV, HSV2 3. Syphilis and bacterial cultures <p><i>Immunological parameters</i></p>	<p>Gen Probe (SB100)</p> <p>ELISA (Reader and Washer) Biological safety cabinet, incubators, deep freezers, centrifuges etc</p> <p>Flow cytometer, thermocycler, ELISA, Biological safety cabinet, cell harvester</p>
4.	<p>Micronutrients</p> <ol style="list-style-type: none"> 1. Bioavailability of micronutrients 2. Food fortification 	<ol style="list-style-type: none"> 1. Human and animal metabolic studies 2. CaCo2 cell line facility 3. DBS facility for vitamin A 4. HPLC and state-of-the-art instrumentation 5. Field studies and operational studies

5.	Isotope unit <ol style="list-style-type: none"> 1. Iodized salt, iron fortified salt, iron and iodine fortified salt 2. Testing kit for iodine in salt 3. Testing kit for iron in salt 4. Iron and iodine fortified sugar 5. Radioisotope studies including RIA 	<p>Salt fortification unit</p> <p>Radioisotope laboratory</p> <p>Iodine monitoring laboratory</p>
6.	Sports Nutrition <ol style="list-style-type: none"> 1. Energy metabolism & body composition 2. Exercise physiology 3. Obesity & weight management 4. Sports nutrition 	<p>Indirect calorimetry</p> <p>Oxycon pro – Graded exercise test monitor</p> <p>Body composition analysis, under water weighing system, whole body potassium counter</p> <p>METAMAX – 3B</p>
7.	Endocrinology <ol style="list-style-type: none"> 1. Foetal programming for adult diseases 2. Health beneficial effects of plant foods 3. Brain insulin signaling and adiposity 4. Micronutrients and apoptosis 5. Blood brain barrier function 	<p>Animal facilities, animal body composition measurement (TOBEC)</p> <p>Protein array system</p> <p>Atomic absorption spectrophotometer</p> <p>Autogamma counter</p> <p>Platelet aggregometer</p> <p>UV-VIS spectrophotometer</p> <p>Chemidoc system</p>
8.	Stem Cell Research <ol style="list-style-type: none"> 1. Stem cell 2. Flagship project 	<p>Tissue culture facilities, animal house facilities, gel doc, PCR</p>
9.	Molecular biology <ol style="list-style-type: none"> 1. Molecular biology of degenerative diseases 2. Global gene expression profiles 3. Identification and molecular characterization of GM foods 4. Gene and nutrient interactions 	<p>Real time PCR, Automated DNA sequence, Fluorescent microscope, Protein purification workstation, Gel documentation system with densitometer, Micro array</p>

10.	<p>Nutrition and Eye Research</p> <ol style="list-style-type: none"> 1. Structural studies 2. Functional foods 	<p>Protein isolation / purification Production of recombinant proteins Biophysical studies – CD/ Fluorescence/ Absorption spectrophotometry, chaperone studies, enzyme assays/ kinetics Animal models & diabetic cataract (Type 1 & 2)</p>
11.	<p>Pathology</p> <ol style="list-style-type: none"> 1. Services 2. Research 	<p>Clinical pathology, surgical pathology (Medical & Veterinary), cytology, haematology, Preclinical toxicology</p>
12.	<p>Extension and Training</p> <ol style="list-style-type: none"> 1. Nutrition Extension and Communication 2. Annual Training Programmes <ul style="list-style-type: none"> ✓ Post Graduate Certificate Course in Nutrition ✓ Annual Training Course on Endocrinological Techniques and their Applications ✓ Training Course on Assessment of Nutritional Anaemias 	<p>Portable exhibition unit, Exhibits related to nutrition and health, handouts & pamphlets Popular publications</p> <p>Resource persons, Faculty members Infrastructure including class room and lab facilities</p>

S.No	Area	Facilities
	FDTRC (Food & Drug Toxicology Research Centre) <ol style="list-style-type: none"> 1. Preclinical toxicology 2. Cancer epidemiology 3. Food safety including mycotoxin testing lab 	<ol style="list-style-type: none"> i. Fully equipped animal facility ii. Well trained animal handlers iii. Trained pharmacology unit iv. Toxicology testing lab v. Pathology lab vi. Statistical dept. vii. Auto analyser <ol style="list-style-type: none"> i. Well trained field staff ii. Well trained biochemists, statisticians iii. Gas chromatograph iv. Auto analyzer v. High pressure liquid chromatograph <ol style="list-style-type: none"> i. Well trained staff ii. Well equipped food safety testing lab iii. Back-up statistical unit iv. Trained field staff
	Lipid Chemistry <ol style="list-style-type: none"> 1. Nutritional biochemistry 2. Lipid biochemistry 3. Molecular biology 	GLC, HPLC, TLC, Concentrators, 2Dgel electrophoresis system GLC, TLC, high speed centrifuge, HPLC, FPLC PCR machines, gel-doc system, UV crosslinker, hybridlatten oven -20°C, -40°C, -80°C deep freezers

S.No	Area	Facilities
	NCLAS (National Centre for Laboratory Animal Science) <ol style="list-style-type: none"> 1. Animal Breeding and Genetics 2. Animal Nutrition and supply of experimental animal feed 3. Health monitoring and perimatology 4. Animal Physiology 	Various laboratories and testing equipments

S.No	Area	Facilities
	<p>PCT</p> <ol style="list-style-type: none"> 1. Safety evaluation (regulatory pre-clinical toxicology) of biotech products (drugs and foods) 2. Safety evaluation (regulatory pre-clinical toxicology) of traditional preparations (Ayurveda, Unani) nutraceuticals 3. Efficacy evaluation and validation of products having therapeutic potentials 	<ol style="list-style-type: none"> i. Biopac polygraph system attached with Samsung PC. [P.C.T] ii. Digital plethysmometer LE 7500 [P.C.T] iii. Autotrack system with event counter [P.C.T] iv. Feed and drinking monitor [P.C.T] v. Implantable micro I.D system [P.C.T] vi. Tail cuff Blood pressure (NIBP) vii. Total body electric conductivity (TOBEC) attached with HP PC and printer. viii. Oxyman respirometer attached with Compaq PC and HP printer. ix. Tail flick apparatus x. Rota Rod System

5.2.2.4. National / International Accreditations

The NIN has following accreditations:

1. Centre for Nutrition Science and Primary Health Care (WHO CC No.121)
2. WHO secretariat for the South-east Asian Regional Office's Nutrition Research-cum-Action Network
3. Federal Wide Assurance (No. FWA 00007785)

5.2.2.5. National / International Certifications obtained

The NIN has following certifications:

Behavioral Sciences - Online certification by University of North Carolina, USA in the field of Behavioral Sciences - Course in the Protection of Human Research Subjects (CITI)

NCLAS - National facility for breeding and experimentation on laboratory animals - Certified by the Committee for the purpose of Control and Supervision on Experimentation of Animals (CPCSEA)

5.2.2.6. Number of collaborations/ Affiliations

The NIN has following collaborations:

Division of Field Studies (4)

1. Impact evaluation of positive deviance programme in West Bengal – UNICEF
2. Assessment of nutritional status of < 5 year children – Govt. of India / UNICEF
3. Integrated behavioural and biological assessment (IBBA) – Avahan project with financial assistance from Bill and Melinda Gates Foundation + Technical collaboration from FHI
4. The effectiveness of an integrated feeding and care intervention among 3-15 months old infants in AP, India – Indo -US

Clinical Division (2)

1. ICMR Task Force project – AIIMS, New Delhi, SGPSI, Lucknow, NIRRR, Mumbai
2. Megacity project – University of Humboldt, Germany

Behavioural Sciences (1)

Indo-US MCHR collaboration

Microbiology (2)

1. Family Health International (BMGF funded)
2. CD Pharmas Pvt. Ltd. India

Micronutrients (4)

1. Dabur Research Foundation, India
2. Micronutrient Initiative, Canada
3. ILSI, USA
4. Micronutrient Initiative, Delhi

Isotope unit (6)

1. Salt Dept. Govt. of India, TNSC, Govt. of Tamil Nadu
2. ICCIDD, New Delhi
3. AP State Govt.
4. Govt, Medical College, Surat
5. TRC, Chennai
6. MRC, Delhi; RMRC, Bhubaneswar, Dibrugarh; NIRRH, Mumbai

Sports Nutrition (2)

1. Sports authority of India
2. Sports authority of Andhra Pradesh

Nutrition and Eye Research (4)

1. University of Michigan, USA
2. Washington University, USA
3. Indian Institute of Science, India
4. University of Pune, India

Pathology (8)

1. Dr.Reddy's Research Foundation, Hyd
2. IICT, CSIR, Hyd
3. Indian Immunologicals, NDDB, Hyd
4. CCRAS, Govt. of India, Delhi
5. Local Govt. Hospitals
6. NIV, ICMR, Pune
7. CCMB, CSIR, Hyd
8. NIN collaborative studies

Endocrinology (3)

Collaborative research with UNICEF, CCMB, India & IGIB, India

Stem Cell Research (1)

Bharat Biotech Pvt. Ltd., India

FDTRC (3)

1. Indo-US
2. Indo-Austria
3. Indo-Bulgaria

Lipid Chemistry (4)

1. ICMR, Delhi, India
2. Heinz Nutrition Foundation India, India
3. Indian Institute of Chemical Technology, Hyd
4. Coconut Development Board, India

NCLAS (1)

Advanced Preclinical toxicology center of NIN

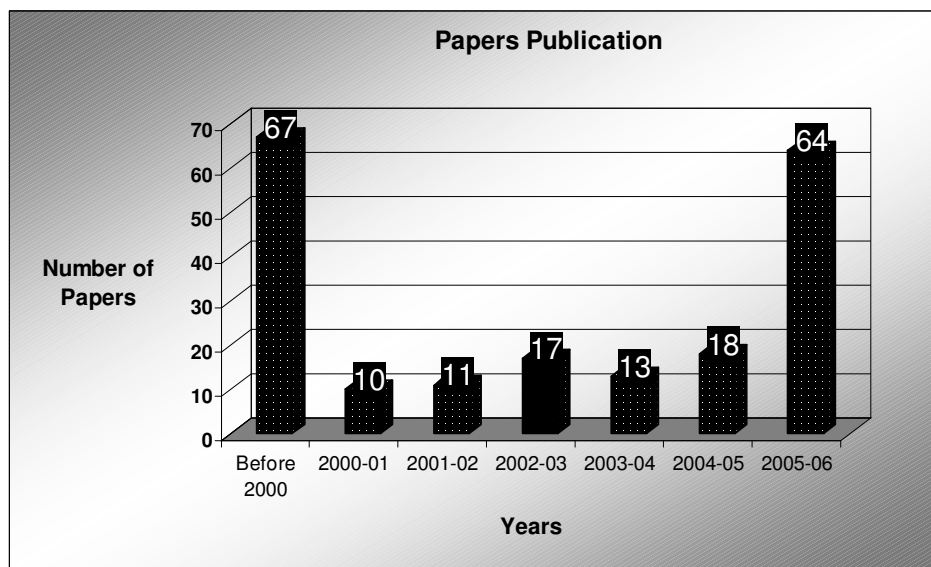
PCT (6)

1. Department of Biotechnology, Delhi, India
2. Indian Institute of Sciences, Bangalore
3. Ministry of health and Family Welfare, GOI
4. Indian Immunologicals Ltd., Hyderabad
5. National Dairy Development Board, Gujarat
6. Multinational Corporate Pharma industries

5.2.2.7. Papers

The following figure 5.6 gives the details of the number of papers published by NIN during 2000 and 2006:

Figure 5.6



(For details about the publications of NIN, refer institute website)

5.2.2.8. Potential Exportable R & D services

NIN has identified the following as their potential exportable R&D services:

- a. Type of R & D services offered:

Services	Div. of Field studies	Behavioral Sciences	Clinical studies	Micro-biology	Micro-nutrients	Isotope unit	Sports Nutrition
Testing	✓	✓	✓	✓		✓	
Training	✓	✓	✓	✓		✓	✓
Consultancy services	✓	✓	✓		✓	✓	✓
Surveys	✓	✓	✓			✓	✓
Studies	✓	✓	✓		✓	✓	✓
IPR services						✓	
Contract Research		✓	✓		✓	✓	
Technology Transfer					✓	✓	
Specialized facilities / services			✓	✓	✓	✓	
Clinical Trials	✓	✓	✓	✓	✓		
Supply of information / Database	✓		✓			✓	

Services	Nutr. & eye	Pathology	Fluorosis	FDTRC	Lipid chem	NCLAS	PCT
Testing				✓		✓	✓
Training				✓		✓	✓
Consultancy services		✓			✓		✓
Surveys			✓	✓			✓
Studies	✓	✓	✓	✓	✓	✓	✓
IPR services							
Contract Research – Design, Product, Process		✓	✓			✓	✓
Technology Transfer							
Specialized facilities / services		✓				✓	✓
Clinical Trials			✓	✓			✓
Supply of information / Database						✓	✓

b. Description of R & D service offered

Behavioural Sciences

1. Training in psychological testing/ assessment
2. Consultant / resource person
3. Studies / surveys as in point no. 10 attached
4. Contract research with GSK. Clinical trial : Indo-US collaboration on MCHR

Micronutrients

1. Bioavailability studies, Evaluation of the products of Dabur research foundation
2. Fortification process MI & ILSI
3. Technology transfer and consultancy services on food fortification to the AP Civil Supplies for producing micronutrient enriched atta under public-private partnership
4. Impact evaluation of fortified foods
5. Clinical trials and facility for DBS vitamin A analysis
6. ELISA of serum ferritin and transferrin receptor

Isotope unit

Three decades of research experience in nutrition and food fortification with micronutrients. Developed low-cost technologies to fortify salt and sugar with iodine and iron either alone or in combination as double fortification. Developed simple and sensitive kits for testing iodine & iron in salt as well as sugar.

Pathology

Histopathology, haematology and clinical pathology as well as toxicopathology services (including IHC & enzyme histochemistry)

Fluorosis

1. Defluoridation material
2. Fluoride mobilizing material

NCLAS

NCLAS, funded by the Indian Council of Medical Research and Department of Biotechnology (Govt. of India), breeds and supply genetically and microbiologically defined laboratory animals to institutions of both government and private sectors. Though a few private suppliers have started their activities in the country, NCLAS has been one of the largest animal resources for both government and pharmaceutical R&D establishments. Because of lack of good quality animal feed with known composition in the country, the center provides large quantity of animal feed to various institutions including R&D establishments of pharmaceutical industries. The center has selectively bred and maintained two obese mutant rats with vast potential for experimental use in biomedical research. The center is involved in human resource development from 1967 onwards by conducting regular training programmes.

PCT

Preclinical safety and efficacy evaluation of various products developed by recombinant technology

- c. Special or Unique features of R & D service offered

Micronutrients

Public health – micronutrient food fortification

Isotope unit

1. Development of technologies in food fortification.
2. Evaluation of organoleptic properties and acceptability of fortified foods.
3. Large-scale production of fortified foods in factories.
4. Impact and efficacy evaluation of fortified foods in the community.
5. Large-scale production of field kits for use in the community.
6. Designing and execution of food technology projects.
7. Setting up of laboratories for food analysis.

Pathology

Preclinical toxicology services

Fluorosis

Capacity binding of fluoride to the material used and field testing

NCLAS

1. Provides good quality small laboratory animals in India since 1989.
2. As part of HRD the institute offers training to matriculates/graduates in animal sciences in the country since 40 years.
3. Produces quality experimental animal feeds which otherwise have to be imported.
4. Identified, bred and maintained 2 unique mutant rat models for studies on obesity, NIDDM and other related disorders.

5.2.2.9. Target Markets

The following target markets have been identified for the above services:

S.No	Competency	Countries
Behavioural Sciences		
1.	WHO Consultancy training in RAP for child feeding practices	Maldives
2.	Mother-child protection card for ICDS in North and Southern regions	Southeast Asian countries
Clinical studies		
1. 2. 3. 4.	Bone mineral density measurements in adults/children Bone health Nutritional rehabilitation of children Nutrition in pregnancy	Ill world countries or underdeveloped countries
Isotope unit		
1.	Technology transfer on IS, IFS & DFS	Bangladesh, Srilanka, Pakistan, Myanmar, Indonesia, Kenya, Nairobi, Ethiopia, Australia and any other country in need of such technology.
2.	Radioisotope consultancy	
Stem Cell		
1.	Adult stem cells	Belgium, USA, Singapore
2.	Embryonic clonal linkage analysis	Spain

Molecular Biology		USA, UK, Germany, Bangladesh, Vietnam, Singapore,
Endocrinology		
1.	Foetal programming	UK, Canada, USA, Australia
2.	Health beneficial effects	Germany, USA, UK
3.	Brain insulin signaling	USA, UK, Australia
4.	Micronutrients and apoptosis	USA, UK, Canada
Pathology		
1.	R & D services	SAARC countries
PCT		
1.	Safety and efficacy evaluation of vaccines	Southeast Asian countries including China, Singapore, Malaysia, Myanmar, Srilanka, Philippines etc..
2.	Safety and efficacy evaluation of drugs	

5.2.2.10. Constraints & Suggestions

NIN highlighted following as the constraints that they faced in providing R & D services in India as well as abroad:

	Micronutrients	Isotope unit	Fluorosis	NCLAS
Marketing Policies of laboratory			✓	✓
Lack of market information	✓		✓	✓
Inadequate marketing capabilities	✓		✓	✓
Bureaucratic bottlenecks			✓	
Inadequate government support for marketing		✓		✓

It was suggested that following can help to overcome these constraints for enhancing exports of R&D Services:

Division of Field Studies

1. International exposure to scientists on various aspects of nutrition and statistical analysis
2. Statistical software package - SAS

Behavioural Sciences

Dissemination of available capacities through National agencies / UN agencies

Clinical studies – Need information and support

Microbiology – Accreditation, Funds

Isotope unit - More interaction with foreign countries

Body composition – Accreditation, Funds

Extension and Training Division

Exposure of the scientists in the areas of nutrition extension, communication, training etc in International organizations

Pathology

1. Increase in manpower content
2. Improved infrastructural facilities
3. Regular training and international exposure

Fluorosis - Requirements of funds towards services

NCLAS

1. To provide funds to improve the infrastructure facilities to obtain national/international accreditation (GLP, AAA).
2. Orientation of existing staff on rules, pertaining to exportation of animals.
3. Advanced training of Scientists and technical staff in the area of laboratory animals.

5.2.3. Regional Medical Research Centre, Jabalpur

The Council's Regional Medical Research Centre for Tribals set up, in 1984, at Jabalpur, addresses itself mainly to the study of the health and nutritional problems of the tribal populations, including nutritional disorders, common communicable diseases, environmental health problems, etc. This Centre provides assistance in planning, monitoring and evaluation of tribal health and other developmental programmes in tribal areas of India (including Madhya

Pradesh) and also in training health functionaries. This Centre is also attempting simultaneously to estimate the magnitude of health problems posed by other common diseases such as tuberculosis, leprosy, diarrhoea, malaria, filariasis, venereal diseases, poliomyelitis, measles, etc. Further, the Centre also studies the blood groups, abnormal haemoglobins and other genetic health problems as also socio-economic, demographic and cultural profile of the tribal population.