

Twelfth Five Year Plan (2012-2017) Activity Report And Thirteenth Five Year Plan (2017-2022) Projections

Social Sciences Division

The Social Sciences Division (SSD) includes the following units: Economic Research Unit (ERU), Economic Analysis Unit (EAU), Linguistic Research Unit (LRU), Economic & Planning Unit (EPU), Population Studies Unit (PSU), Psychology Research Unit (PRU) and Sociological Research Unit (SRU). EAU is situated at the Bangalore centre of ISI, EPU is situated at the Delhi centre of ISI and the remaining five Units are located at the Headquarters in Kolkata with SRU having a branch in Giridih. Scientific Workers of this Division are engaged in research, Project work, teaching and training activities at various levels. Faculty members are also involved in supervision of doctoral research.

The areas of research in various disciplines are chosen keeping in mind the social relevance of the problems studied as also the commitment to advancement of knowledge in these disciplines.

In the following pages, we provide a brief report of activities during the Twelfth Plan Period, and outline of activities to be taken up during the Thirteenth Plan period for each Unit.

Economic Research Unit

ACTIVITIES AND ACHIEVEMENTS DURING THE TWELVE FIVE-YEAR PLAN PERIOD (2012-2017)

The scientific workers of Economic Research Unit (ERU) are extensively involved in research, teaching, training, consultancy and academic administration. The research activities are carried out at individual and unit levels. These include both theoretical and empirical research in economics and econometrics. Research is also being carried out in collaboration with different universities (Seoul National University, South Korea, University of New South Wales, Sydney, Australia, University of Leicester, United Kingdom, Pennsylvania State University, USA, Ryerson University, Canada, Lund University, Sweden, Durham University, UK, Boston University in USA, Monash University in Australia, LSE in UK, Maastricht University, The Netherlands), different government and private organizations, institutions (Planning Commission, Government of India, 4th State Finance Commission, West Bengal, ICSSR, Government of India, IGC, London School of Economics, London). The research output is published in peer reviewed national and international journals.

ERU scientific workers regularly take part in teaching the regular courses of the Institute like the B.Stat, M.Stat, MS (QE), M.Tech and ISEC courses. They are also involved in teaching at various universities of India and abroad. Research guidance is also provided in a regular basis to the research fellows of the institute and as well as of other institutes and universities.

The scientific workers of ERU serve as members of editorial boards of several journals and help in editorial collaboration. They are involved in academic administration and administrative works of the institute. They also serve in various committees formed by the Government and other academic bodies. Various national and international conferences/seminars are organized in a regular manner.

FOCUS OF RESEARCH ACTIVITIES DURING 13TH FIVE YEAR PLAN PERIOD (2017-2022)

With the objective to cater to the need of the government for policy-making for socio-economic development, to upgrade the courses of the institute and to introduce new subjects in courses, the focus now is to continue and upgrade research on the following themes: macroeconomic problems of Indian economy, game theory and applications, growth theory, environmental economics, industrial organization, applied economics, inequality and welfare, globalisation and privatisation, international economics, poverty and inequality, gender inequality, applied and theoretical econometrics, financial econometrics, and econo-physics.

It is now time for a substantial increase in the staff strength of ERU through new recruitments at all levels so as to be able to continue with the increasing volume of activities. It is worth noting, in this context, that the staff strength of ERU has reduced significantly due to retirement from services as well as lack of new recruitments in the recent past.

Linguistic Research Unit

ACTIVITIES AND ACHIEVEMENTS DURING THE 12th 5 YEAR PLAN (2012-2017)

1. Research Works:

During the period (2012-2017) the Linguistic Research Unit of the Institute has continued with its innovative programmes of research in the areas of *Cognitive Linguistics*, *Corpus Linguistics*, *Computational Linguistics*, *Language Technology*, *Sociolinguistics*, *Field Linguistics*, *Descriptive Linguistics*. The Unit focused its research activities on the following subdomains:

- (a) **Substantivist Lexicological Study of Bangla:** The substantivist study of conceptual networks on the basis of *Whole Word Morphology* rests on earlier work, which demonstrated a connection between this inquiry and the linguistics of lexico-phrasal difficulty. The work done in the present context is part of a long-term exercise in the domain of conceptual structure studies with reference to the lexicon. The purpose is to develop empirical base for a corpus-based electronic lexicon for Bangla. A corpus-based electronic lexicon is an indispensable resource for research and application in Language Technology (LT) and Natural Language Processing (NLP). This type of resource is of use in machine translation, information extraction, word-sense disambiguation, semantic net, ontology, etc. Also, it has direct academic relevance in electronic dictionary and thesaurus development, language teaching (first and second language), discourse analysis, lexical semantics, and language cognition. The Electronic Lexicon envisaged in this research will be the first work of its kind for Bangla, and the enterprise may be extended to other Indian languages if corpora are available. The utility of the work is further enhanced by two specific features. First, the proposed Lexicon is of the Differentiated type in the sense of Dasgupta, Misra and Datta (2002). In a Differentiated Lexicon, the asymmetry between peripheral and kernel items drives intra-lexical glossing, and the artificial metalanguage Esperanto serves as the glossing mediator, on cognitive-scientific grounds provided in Dasgupta (2006). Second, the proposed Lexicon not only uses frequency within the corpus to determine

the kernel-periphery boundary but also provides specific frequency data for each lexeme. This will be the first electronic lexicon for Bangla.

- (b) **Interlexical Study of Asamiya in a Substantivist Framework:** The purpose of this project is to develop the empirical base for electronic lexical resources for Asamiya. Electronic lexical resources are an essential presupposition for other sectors in research within the domains of Language Technology (LT) and Natural Language Processing (NLP). This type of resource is of use in machine translation, information extraction, word-sense disambiguation, semantic net, ontology, etc. Also, it has direct academic relevance in electronic dictionary and thesaurus development, language teaching (first and second language), discourse analysis, lexical semantics, and language cognition. The proposed lexical resources will set a precedent for Asamiya, and the enterprise may be extended to other Northeastern Indian languages for which background descriptive material is available on a similar scale. The utility of the project is further enhanced by the fact that it extends the advances in interlexical understanding attained in the context of earlier research on Asamiya, Boro and Bangla.
- (c) **Sociolinguistics:** The unit has taken up the study of lexical and syntactic difficulty in relation to recent advances in our understanding of cognition and of discourse. The sociolinguistic axis of linguistic difficulty has been studied within single languages, in relation to the mapping between the full conceptualization system and its basic level kernel, and across languages in the Indian context. An important background factor that has determined the choice of specific subdomains for this research is the place of English in the sociolinguistic landscape of India.
- (d) **Corpus Based English Language Teaching (C-BELT) System:** LRU is working towards developing a generic model for Corpus-Based English Language Teaching (C-BELT) for the Bangla speakers. It has been observed that the idea of teaching English language to learners with direct reference to English Language Corpora (ELC) is a more useful strategy, as data and information obtained from modern ELC provide authenticity and reliability towards the process of teaching English as a second language to the learners. We propose to access and utilize the English Language Corpora directly in classroom situation with information obtained from corpora through utilization of corpus processing techniques, such as, concordance, lemmatization, POS tagging, morphological processing, bilingual lexical databases, etc. for teaching English to the Indian learners. We also propose to encourage Indian learners to extract relevant linguistic data, examples, and information from the English Language Corpora to increase their knowledge in the language as well as enhance their communicative competence and communication skill in English in various interactional environments. Furthermore, we envisage English Language Corpora as an authentic source of data and linguistic information, which may be directly utilized for developing ELT text books, bilingual dictionaries, dictionary of idioms, phrases and proverbs, graded vocabulary, and primary and advanced grammar books for the Indian learners. We are planning to generate a lexical database of basic and graded vocabulary of English from the English Language Corpora to be used in the development of a C-BELT system for the Indian learners.
- (e) **Domain-Specific Parallel Translation Corpora from Hindi to Bangla:** We are developing a Hind-Bangla parallel translation corpus keeping Hindi as the source language and Bangla as the target language. The second phase of the project (ILCI-2) has so far produced 35,000 Hindi-Bangla parallel sentences covering two domains of information sharing: Agriculture and Entertainment. Each sentence has an average length of sixteen (16) or more words in the target language output. The most vital feature of this bilingual parallel sentence database is that

parallelism between the two languages (Hindi and Bangla) is maintained and preserved at both semantic and syntactic level (i.e., structural and thematic parallelism) – making the translation corpus an indispensable resource for cross-lingual information retrieval, bilingual lexical database generation, bilingual dictionary compilation, bilingual wordnet development, word sense disambiguation, domain-specific lexical database generation, translational equivalent extraction, core grammar development, machine translation, language teaching and cross-cultural research. The second phase (ILCI-2) has started in April 2012 and is scheduled to end in September 2015.

- (f) **Bangla Web Corpus (a Multidisciplinary Monolingual Bangla Corpus with Web Texts):** As an important component of Indian Languages Corpora Initiative (ILCI-2) project, we are developing a multidisciplinary and multidirectional monolingual Bangla corpus (Bangla Web Corpus) with text data retrieved from internet, digital portals, and web pages. At present it contains more than 30,000 sentences obtained in equal proportion from the domains of games and sports, tourism, economics, art & culture, entertainment, literature, and politics & public administration. We have tried to address the methods and strategies that we applied for this purpose; the issues that have cropped up in the act of generating the whole corpus database; and the major problems that we faced at the time of creating the corpus. Fishing language data from the web and harvesting the Bangla web corpus may be treated as a milestone in the history of Bangla corpus development, which holds tremendous potentials for opening up new avenues for web crawling and language corpus building in the wider spectrum of language technology, and applied linguistics. An on-line version of the corpus will contribute towards building an interface where language users will be allowed to navigate through the web-enabled corpus to address their linguistic needs. Along the side of corpora generated from printed texts, the corpus produced from web texts may be used in natural language processing, linguistic resource development, cross-lingual communication, globalization of linguistic profiles and language resources, digital lexical database, computational lexicography, language planning and E-governance. Here lies the theoretical relevance, empirical pertinence, and functional importance of this work which seeks to propose a makeshift guideline for the new generation of corpus developers in Indian languages.
- (g) **POS Tagging of Bangla Words in the Bangla Corpus:** We have developed a well-planned and hierarchical POS tagset for the Bangla text called the “BIS Bangla Tagset” (for the Bureau of Indian Standard) as a benchmark standard to be used in POS tagging of Bangla text of all types. We have used this POS tagset to develop a POS tagged corpus of 50,000 Bangla sentences relating to health and tourism domains as well as 10 thousand sentences from the Bangla web corpus. An important bi-product of this work is the generation of POS tagged digital lexical database for Bangla which is now being used to compile digital Bangla dictionaries, thesauruses and wordnet. The database can also be used in some other NLP works such as information retrieval, grammar development, machine learning, language teaching, word sense disambiguation, lemmatization, morphological analysis, and in mainstream and applied linguistics. The POS tagset as well as the POS tagged Bangla corpus is available at the TDIL Data Centre, Govt. of India homepage.
- (h) **Digital WordNet for Bangla:** We have developed a WordNet for Bangla that stands parallel to other wordnets developed for other Indian languages, e.g., Hindi, Sanskrit, Marathi, Konkani, Urdu, Oriya, Gujarati, Kashmiri, Tamil, Telugu, and Malayalam, etc. We have adopted an intricate interface of lexical structure made of synsets (i.e., set of synonyms) where semantic relations of words, in which synsets act as sets of synonyms to refer to similar or near similar

concepts, are linked up with one another in implicit dichotomies of semantic relations like hypernymy and hyponymy (is-a relation), meronymy and holonymy (part-of relations), and troponymy (manner-of relations), etc. expressible through their conceptual linkages in the wordnet. In the act of Bangla wordnet creation, the central focus is concentrated not on the words but on the concepts the word(s) are capable of denoting. Based on the idea of covering a large number of senses within a generic frame, we have used the Expansion Approach, since our primary goal is to link up the Bangla synsets with the synsets of other geographically, genealogically and typologically related Indian languages along with English wordnet. So far we have completed 36,000 synsets and are on the process of creating more than 1000 Language Specific Synset (LSS) that are meant to represent the uniqueness of Bangla life, living, language, people, and culture in the WordNet.

- (i) **SHELL System for Teaching English to Bangla Learners:** Researchers as well as society in general must now face a situation when the serious teaching English is being reintroduced in West Bengal after a gap of nearly 20 years at the primary school level. At the crucial stage of reintroduction of English at primary level in West Bengal it is noted that there are neither suitable textbooks, nor good ELT resources, nor trained teachers who can make this mission successful. That means there is no academic support of any kind that can be accessed and utilized for fruitful execution of ELT courses in the state. Keeping this state of affairs and the target learners in mind we have proposed a strategy for developing ELT textbooks in such a way that the target learners are able to learn English, at least at the initial stage of learning, in their own ways through direct utilization and assistance of their mother tongue. Since there is no one to help them learn English, the learners will help themselves in this process of learning. Therefore, we call this strategy as the Self Help English Language Learning (SHELL) system. This new strategy is adopted on an experimental basis for developing textbooks and learning materials for the new generation of Bangla learners who are being exposed to English for the first time in life at the primary level. Let it be assumed that the target learners, for which this method is being proposed, have acquired some kind of linguistic efficiency in their mother tongue, and are now sent to primary schools to learn English as a second language. It has been also assumed that these students receive no academic help or tutorial support from their parents in the act of learning English, since these students are mostly first generation learners. What they can expect is a kind of passive help or guidance from their teachers only during school hours. At present, we have completed the task for developing resources that can guide Bangla-speaking children to learn orthographic forms, pronunciations, and usage variations of the English vowels and consonants with direct use of their mother tongue – Bangla. Now we are trying to develop the GUI for the application purpose.
- (j) **Linguistic Field Survey in Jharkhand:** We have conducted Linguistic Field Surveys at four villages in the districts of Ranchi, Hazaribagh, and Ramgarh in the state of Jharkhand among the native Khortha speakers for the purpose of elicitation of samples of spoken data in the form of lexical list, sentence list, and free discourse speech along with some recordings of local songs, lullabies, riddles, death songs, birth songs, marriage songs and other socio-cultural events and narrations thereof. The primary purposes of this survey are to digitally record and document the linguistic details of the language and its speech community for its preservation and promotion. The utilization of the Khortha speech database may be realized in understanding the general as well as special linguistic features and phenomena of the language, recording its separate linguistic identity with regard to the standard variety and other sister varieties; developing general and special lexicon of Khortha; writing descriptive grammars; producing texts and study materials; compiling dictionaries and thesauruses; and producing information for standardization of Khortha. The Khortha speech corpus is now available for other branches of

social science like anthropolinguistics, ethno linguistics, sociology, demography, history, sociolinguistics, psycholinguistics, ecolinguistics, culture studies, etc.

- (k) **Bangla Pronunciation Dictionary in Electronic Form:** The objective of this project is to develop a Bangla pronunciation dictionary in electronic and printed form with the lexical database obtained from a corpus of modern Bangla texts. It will become an indispensable resource for research and application in applied linguistics, lexicography, speech technology, language technology, and language processing. Till date, we have collected a lexical database of 60,000 words from a printed Bangla dictionary and from a large lexical database of the modern Bangla text corpus. The wordlist includes all Tatsama, Tadbhava, Deshi, and foreign words of different forms and part-of-speech. These words are being used in the pronunciation dictionary in their lemmatized and alphabetically sorted form. To avoid linguistic controversies, the spelling of the words is fixed following the proposal of the *Pashchimbanga Bangla Akademi, Kolkata*. Each word is being transliterated in Indic Roman tagged with diacritics for all types of end users. Accepted pronunciation of *Standard Colloquial Bangla* (SCB) is adopted for the words, and this is presented in standard Bangla script for those people who know Bangla script but do not know IPA; as well as in IPA for those people who know IPA but do not know Bangla script, particularly the learners of Bangla at various universities and institutes in Europe, USA, and other countries. The meaning for each word is given for sense disambiguation and pronunciation determination, which is particularly useful for those homographic and homophonous homonyms (words having similar orthographic forms or pronunciation but different meanings). The audio output of pronunciation of the words will be available in sentence-free and sentence-bound contexts. At present, pronunciation details of the vowel-initiated words are complete. We are working on the remaining words included in the dictionary. The work of project will continue for next three years.
- (l) **Linguistic Field Survey in West Bengal:** We have conducted linguistic field Survey for language documentation of an unrecorded local language variety used in the east part of West Medinipur district in the state of West Bengal India. Started on 6 March and ended on 11 March 2016. We covered 8 villages (Kankrajit, Kesrambha, Khandarui, Shabra, Kariya, Atanga, Kukai, Gaganeswar), 50+ informants, covering an area of nearly 50 square kilometers. Collected audio text, video text, word lists, sentence lists, Free Discourse Text, songs, stories, folk tales, mantras, hymns, riddles, lullabies, dance, narratives, cultural texts, heritage, history, anecdotes, and all other verbal texts of the communities. Total data: 40 GB+. The database is being processed for speech transcription, text analysis, lexical resource generation, digitization. The speech corpus is available for other branches of social science like anthropolinguistics, ethno linguistics, sociology, demography, history, sociolinguistics, psycholinguistics, ecolinguistics, culture studies, etc.

2. Project Supervision:

The activities of the Unit also included supervision of internal and external projects as well as providing assistance to other sister institutes and universities in the domains specified above. The faculty members of the Unit have visited several countries and institutes within and outside the country for research and academic purposes.

3. Publications

During last five years nearly 10 books and more than 100 quality research papers were published by the members of the Unit in various national and international journals.

4. Workshops and Seminars:

LRU has organized 4 International Workshops and several (10+) seminars at ISI Kolkata.

5. Visiting Scientists

There have been a total of 20 Visiting Scientists at LRU during this period from India and abroad.

6. Physical Targets and Achievements of the Plan Projects during first four years of 12th Five Year Plan (2012-2017)

6.1 General

Sl. No	Name of the Scheme/Project Programme	12 th Plan Approved Target	Achievements and targets for as percentage of 12 th 5 Year Plan targets	General Remarks
(1)	(2)	(3)	(4)	(5)
1	Bengali Pronunciation Dictionary in Electronic and Printed Form.	2012-2015	100%	
2	Linguistic Field Survey at Giridih, Jharkhand.	2012-2013	100%	
3	Substantivist lexicological study of Bangla	2010-2013	100%	
4	Biaxial Study of Bangla Lexicosyntax	2013-2016	100%	
3	Bengali Pronunciation Dictionary	2015-2018	75%	
4	Workshop on Language Technology and Cognitive Science (LTCS)	2015-2016	100%	

6.2 North East

Sl. No	Name of the Scheme/Project Programme	12 th Plan Approved Target	Achievements and targets for as percentage of 12 th 5 Year Plan targets	General Remarks
(1)	(2)	(3)	(4)	(5)
1	Interlexical study of Asamiya in a substantivist framework	2011-2014	100%	
2	The Biaxial Syntax of Inflected Clauses in Assamese and Bangla	2014-2017	75%	
3	Advanced Academic Programs (Linguistics) for North Eastern States	2016-2017	50%	

7. Externally Funded Projects

- (a) Indian Language Corpora Initiative-II (Bengali) (2012-2015). Funded by Dept. Electronics and Information Technology (DeitY), Ministry of Communication and Information Technology (MCIT), Govt. of India. Principal Investigator: Niladri Sekhar Dash.

Tentative Plan Project Proposals for the 13th Five Year Plan (2017 to 2022)

FOCUS OF RESEARCH ACTIVITIES DURING 13TH FIVE YEAR PLAN PERIOD (2017-2022)

There are at least five main research and development areas under which the Unit's future research programmes may be grouped, namely:

- (a) **Interface between Linguistics and Cognitive Science:** The interface between linguistics and the rapidly developing areas of cognitive science is a major focus of LRU's scientific planning for the 13th Plan Period. In particular, biaxial syntax, whole word morphology, substantivist lexicology, bifocal translation theory, the semiotics and formal morphosyntax of proper nouns are among the topics on the current wish list for the Plan Period.
- (b) **Corpus Linguistics and Language Technology:** Generation of text corpora; generation of specialized corpora; generation of parallel corpora; processing of corpora; annotation of corpora; POS tagging and chunking; development of tools and techniques of corpus processing; generation of lexical and linguistic resources; development of resources for text-to-speech for Bangla; development of electronic dictionary for Bangla; development of usage-based grammars for Bangla; word sense disambiguation; computer assisted English and Bangla language teaching; development of usage-based on-line dictionaries; development of graded vocabulary; analysis of corpora for developing linguistic theories and principles; upgradation of Bangla WordNet; development of digital corpus archive for Bangla, etc.

- (c) **Documentation and Digitization of Endangered Languages:** Conducting exhaustive linguistic field surveys among endangered (minority) language communities; digitally recording attitudes of native speakers towards their languages; eliciting samples of speech data in the form of lexical list, sentence list, and free discourse speech; recording folk-linguistic and extralinguistic text relating to socio-cultural events and geo-climatic factors; collecting language-related information (with emphasis on sociolinguistic, ethnolinguistic, demographic, and ecolinguistic issues); documenting and uploading all linguistic data and information in the form of open-access digital texts; identifying the language-related requirements of the native speakers; developing various linguistic textbooks, resources, and study materials; developing general and special lexicons; compiling dictionaries and thesauruses; and making data available for other disciplines like anthropolinguistics, ethnolinguistics, sociology, demography, history, sociolinguistics, psycholinguistics, ecolinguistics, culture studies, etc.
- (d) **Sociolinguistics:** Sociolinguistic dimensions of lexical and syntactic difficulty, mapping between full conceptualization system and its basic level kernel, place of English in the sociolinguistic landscape of India, study of language attitudes, language maintenance and language shift, measurement of bilingualism, language planning in multilingual society, analysis of folklore and folk language, cultivation of mother-tongue, language standardization, etc.
- (e) **Bangla Linguistics:** Bangla phonetics, phonology, morphology, syntax, semantics, lexicology, lexicography, sociolinguistics, field linguistics, discourse, pragmatics, conversation analysis, Bangla teaching, spoken text analysis, stylistics.

Population Studies Unit

ACTIVITIES AND ACHIEVEMENTS DURING THE 12TH FIVE-YEAR PLAN (2012-2017)

During the 12th Five Year Plan period, scientists of the Population Studies Unit were involved in various teaching, training, research and developmental activities. The unit regularly conducted teaching/training programmes along with seminars and workshops. It also participated in teaching in ISEC Courses in regular as well as specialization in Demography. Some collaborative research projects with other units and also with other institutions were undertaken by the scientists of the unit. The scientific members of the unit published several papers in scientific journals and books, and participated as a speaker or resource person in national and international seminars, conferences and workshops. The following were the major research activities of the unit during the above said plan period: (1) Co-relates of Diarrhea among children aged 0-4 years in Indian states; (2) Health Inequality of Child Mortality in Different States of India; (3) Impact of spacing between age at marriage and first birth and also between two births on maternal and child healthcare in India; (4) District Level Divergence in India in Post-reform Period: Relationship between Infrastructure, Vulnerable Class and Purchasing Power; (5) Poverty, Disparity and Development in Indian Districts: Findings from a Perception Survey; (6) A New Relative Measure of Poverty, Inequality and Vulnerability across Indian Districts: Comparison between 61st Round (2004-05) and 66th Round

(2009-10) of NSSO; (7) Estimation of components of under-five mortality and of their trends in India using SRS data; (8) Projection of infant and under-five mortality and achievement of Millennium Development Goal in Indian States; (9) Contraceptive use and Fertility Preference in Indian states; (10) Domestic Physical Violence, Contraceptive use, and Unwanted Pregnancy in Rural India; (11) Impact of spacing between age at marriage and first birth on maternal and child healthcare in India; (12) How developmental factors influences investment climate: a comparative study in different states of India; (13) Inequality in Child Mortality in the North Eastern States of India; (14) Gender Disparity in Nutritional Status of Children in India; (15) Co-relates of Fertility Preference among Currently Married Women in Indian States ; (16) Under-Nutrition in Children under five years in Purulia District of West Bengal; (17) The reasons for dropout of mentally retarded children from therapeutic intervention in urban areas of West Bengal; (18) Health and Economic Consequences of Malnutrition in a backward district of West Bengal; (19) Efficiency and Equity in immunization status of children aged 0-5 years across Indian states; (20) Inequality and inequity change in health utilization in India: A decomposition Analysis; (21) Women's autonomy, education and birth intervals in India: visiting the less familiar; (22) Effect of nativity and duration of residence on chronic health conditions among Asian immigrants in Australia: a longitudinal investigation; (23) Hindu-Muslim fertility differentials in India: a cohort approach; (24) Maternal Exposure to Intimate Partner Violence and Child Health in India: Evidence of an Association from NFHS-3.

Physical Targets and Achievements of the Plan Projects during 12th Five Year Plan (2012-13 to 2016-17)

Sl. No.	Name of the Scheme/ Project Programme	12 th Plan Approved Target	Achievements & Targets for 2016-17 as percentage of 12 th Plan target	General Remarks
1	Workshop on Techniques of Analysis of Demographic and Health Statistics and Application of Computer Software.	2012-2013	100%	Completed
2	Developmental Challenges in Children and Associated Socioeconomic Factors: A Study in the Purulia District of West Bengal.	2014-2016	100%	Completed

FOCUS OF RESEARCH ACTIVITIES DURING THE 13TH FIVE-YEAR PLAN (2017-2022)

The following will be the areas for future research:

- (i) National Policies on Population growth;
- (ii) Economic and Social aspect of ageing of Population;
- (iii) National and International Migration and its Spatial Distribution;
- (iv) Demographic Impact HIV/AIDS and Trends and Policies for Megacities;
- (v) Reproductive and Child Health (RCH) and Related Issues;

- (vi) Epidemiology and Morbidity of Population;
- (vii) Micro Approaches to Demographic Research;
- (viii) Family Demography and Life cycle;
- (ix) Demographic and Health Transition;
- (x) Urbanisation and Recent Trends;
- (xi) Population Education;
- (xii) Labour Employment, Labour Problems and Demographic Dividend;
- (xiii) Empowerment of Women;
- (xiv) Issues on Population Development;
- (xv) Inequalities in child health and related issues;
- (xvi) Developmental challenges among Children and Contributory Factors;
- (xvii) Adolescent's Health Problems and Associated Causes
- (xviii) Training of New Generation of Demographers and the Organization of Research along lines appropriate to the Modern Pursuits of Inter Disciplinary Collaboration.

Psychology Research Unit

ACTIVITIES AND ACHIEVEMENTS DURING THE TWELFTH FIVE-YEAR PLAN (2012-2017)

The scientific members of the Psychology Research Unit were engaged in research in different areas of psychometrics and in various applied fields of Psychology during the twelfth five-year plan. Fourteen B.Stat students (3rd year) opted psychology as optional and successfully completed the course. The course included both theory and practicals. The course was introduced in 2014. Two research fellows obtained Ph.D. degrees during this period. Six training workshops and one symposium were conducted during this period. Scientific members of the unit also organized training programs in other research institutes and universities. Twenty-seven research papers were published in peer reviewed journals. There were publication of one book and four book chapters. The unit had 28 visiting scientists from India and abroad during this plan period. The Unit was also involved in external projects, namely, Recruitment of Accounts Assistants in KMDA. Scientific members of the unit were engaged in research activities in the following areas during this twelfth five-year plan:

1. Cognitive Processing through PASS model and its role in determining Academic Performance of School Students of North- Eastern India
2. Understanding Competition through Associative Group Analysis Technique
3. Differential validity of Computer Programming abilities
4. Personality Profile, Stress and Job Satisfaction of Indian Sea Farer
5. Role of career stages, Self-efficacy and School Environment on Job Satisfaction of School Teachers
6. Latent trait modeling of cognitive self-efficacy

7. Teachers' Belief for Innovative Teaching & its relation with Personality and Innovative Work Behaviour
8. Inter-item Correspondence of categorized data
9. Attitude towards Disabled children
10. Attitude towards gardening: A problem of conservation psychology
11. Recruitment of Accounts Assistants in KMDA (External Project).
12. Construction of achievement test
13. Cognitive Self-efficacy
14. Innovative Self-efficacy of School Teachers
15. IPA in understanding Diabetes
16. Reasoning ability across different demographic conditions
17. Predictors of motor insurance
18. Job satisfaction of agent in insurance sector
19. Customer Satisfaction in Life Insurance Corporation
20. Parenting style and academic achievement of the school students
21. Self- esteem and Coping strategies in University students
22. Development of Information processing test through Successive Learning
23. Development and Validation of a Cognitive measure for Juvenile Delinquent in the Indian Context
24. Visuo-spatial Reasoning abilities among adolescent high school students
25. Cognitive Self-Efficacy in Schizophrenia
26. Reliability of self-care efficacy in diabetes
27. Determinants of fertilizer purchase decision
28. Medical Healthcare Insurance Need
29. Rabindrik Value Orientations of War Returned Senior Rank Police Officers
30. Flow across Layers of consciousness : Indian model of health psychology
31. Verbal reasoning of the Visually challenged
32. A Study on Innovative Self-efficacy of School Teachers
33. A study on Visuospatial Reasoning ability of adolescent school students
34. Self-care efficacy in Diabetes management
35. Metamemory: A brief review
36. Spirituality and Self-esteem among adolescent boys and girls of H.S. School,Kolkata
37. Loneliness and social adjustment in old age.

Physical Targets and Achievements of the Plan Projects during first four years of 12th Five Year Plan (2011 – 2012 to 2015 – 2016)

Srl. No	Name of the Scheme/Project Programme	Twelfth plan Approved Target	Achievements and targets for 2015 – 2016 as percentage of 12 th Plan target	General Remarks
1	Differential Validity of Computer Programming abilities	2012-2013	100%	Completed
2.	Personality Profile, Stress and Job Satisfaction of Indian Sea Farers	2012-2013	100%	Completed
3.	Cognitive Processing Through PASS model and its role in determining Academic Performance of	2012-2013	100%	Completed

	school students of North-Eastern India			
4.	Differential Validity of Computer Programming abilities	2013-2014	100%	Completed
5.	Personality Profile, Stress and Job Satisfaction of Indian Sea Farers	2013-2014	100%	Completed
6.	Cognitive Processing Through PASS model and its role in determining Academic Performance of school students of North-Eastern India	2013-2014	100%	Completed
7.	Parenting styles and academic achievement of school student	2014-2015	100%	Completed
8.	Cognitive Processing through PASS model and its role in determining Academic Performance of School students of North-Eastern India	2014-2015	100%	Completed
9.	Differential Validity of Computer Prog. abilities	2014-2015	100%	Completed
10.	National Conference on Adolescence Dev.	2014-2015	100%	Completed
11.	Sumer/Winter School on Data...Research	2014-2015	100%	Completed

FOCUS OF RESEARCH ACTIVITIES DURING 13TH FIVE YEAR PLAN PERIOD (2017-2022)

During this 13th Five-year plan Psychology Research Unit wants to set up a Perceptual and Cognitive Science Laboratory to undertake some interdisciplinary researches on cognitions, memory, brain-computer interface or BCI, neuro-psychology and genomics. Besides laboratory based research, the unit will focus on field based studies specifically in the areas of safe school research, primary and secondary education, human resource development, organization development, and psychological data mining. Unit will provide courses on Experimental design and application of multivariate statistics in both lab and field based studies. The areas of research have been chosen keeping in mind its impact on society. As and when reasonable number of faculties, visiting scientists, scientific staffs and administrative staff members will be available, large scale project works of National or social importance can be undertaken.

Sociological Research Unit

ACTIVITIES AND ACHIEVEMENTS DURING THE TWELFTH FIVE-YEAR PLAN (2012-2017)

The scientific members of the Sociological Research Unit were engaged in research in different areas of social and economic development, with special emphasis on rural India.

The faculty members were actively engaged in supervising Ph.D. students, and three students completed their doctoral theses (through the University of Calcutta) during this period. The unit had 10 visiting scientists from India and abroad during the plan period. From 2012, the Unit began a regular seminar series, with speakers from within the Department and outside.

Scientific members of the unit were engaged in research activities on a wide range of topics including:

Socio-economic analyses of villages

Methodology of estimation of poverty and BPL category

Empowerment of women

Social Network Approach (SNA) and migration in rural India

Education and Indian society

Food habits and consequences with a special focus on school children

Social stratification with special focus on caste society and development

Situation of Dalit households in village economies

Rural household incomes

Impact of globalization on rural India, with a special focus on credit and employment

Gender segregation of occupations

Child Labour schools.

Physical Targets and achievements of the Plan Projects during first four years of 12th Five year Plan (2012- 2017)

Sl. No.	Name of the project	12 th Plan Approved target	Achievements and targets for	General Remarks
(1)	(2)	(3)	(4)	(5)
1	Utilization of developmental inputs by the Scheduled Castes (SCs), Scheduled Tribes (STs) & Other Backward Class / communities (OBCs) and their Social Networks: Experiences in Jharkhand	2011-2013	100 %	Completed

2	Evaluating Official Statistics on Land and Livestock holdings	2012-2014	100 %	Completed
3	Data Gap in Gender Statistics: Women in Mining Industry	2012-2015	100 %	Completed
4	A micro level study of childhood obesity and TV watching in Kolkata and its periphery, West Bengal, India	2013-2015	100 %	Completed
5	Migration, social network and their impact on the rural households of Jharkhand.	2013-2015	100%	Completed
6	The contribution of unpaid family workers in the handloom sector of textile industry.	2015-2017	90 %	Report to be finalised
7	Contract farming participation and emerging trend in agrarian relations: The case of potato growers in West Bengal.	2015-2017	90 %	Report to be finalised

FOCUS OF RESEARCH ACTIVITIES DURING 13TH FIVE YEAR PLAN PERIOD (2017-2022)

The following are some of the main research areas that we wish to develop during the next Plan period.

1. Agrarian studies with a focus on village studies. Over the last few years, the team of faculty and students in the Unit has built up a body of analyses based on village study data from different States. In the next five years, we would like to consolidate this work to arrive at a better understanding of social and economic situation in contemporary rural India. This research will cover features of land and labour markets, assets and indebtedness and incomes and occupations.
2. Evaluation of official statistics dealing with land and other assets in rural areas, employment and credit: There are several important variables pertaining to rural households for which official statistics are not fully reliable (either there are gaps in the data or definitional problems or problems in terms of loss of information and accuracy due to aggregation at the time of tabulation. In addition, there are problems of comparability of data across surveys, regions, and time-periods. One such variable is land holdings, a variable that is essential to understand some important aspects of land relations. This project proposes to assess the quality of existing official statistics on variables such as land holdings. It will also propose new survey schedules and definitions (such as for the Survey on Land and Livestock Holdings), and test these with data from village surveys.
3. Social discrimination in rural India: While there is a body of literature that documents discrimination and denial of civil liberties, there are very few studies by economists of market and non-market forms of discrimination and socio-economic exclusion. Scholars have emphasized the need for rigorous village-level micro- studies by economists of different aspects of Dalit households in village economies, and, specifically, the need for studies of the access of the victims of sectional deprivation to land, employment, credit,

and other inputs in the contemporary context (Thorat and others). In this context, we would like to use the available data base from village studies undertaken by us and associated scientists in other institutions to understand patterns of social discrimination in the economic sphere.

4. Childhood obesity and TV watching in India: In developed countries, this type of study is very common but it is an emerging problem among the urban Indian children. Also there have been a limited number of studies on this emerging issue. Therefore, it is noteworthy to study television (TV) watching and childhood obesity in Indian society.
5. Migration, social network and their impact on the rural households: It has been observed in various studies that migration has brought both positive and negative impacts on the socio-economic conditions in the village scenario. In one hand, migration helps (i) to increase the standard of living of the migrants, (ii) to generate the possibility of investments and savings, and (iii) to slacken the power grasped by the upper-caste land-owners. On the other hand, (i) the income from migration may not be sufficient to balance the excessive expenditure in market products newly adopted through migration, like introducing of catering and decoration in festivals, use of luxurious goods, etc.; (ii) at peak period of cultivation, there is a shortage of labour due to out-migration and, as a result, it creates negative labour impact on production (Taylor and Dyer, 2006); and (iii) migration contributes to increase in the incidence and spread of different contagious diseases. There are broadly two kinds of migration, like permanent and temporal. A social network is defined as an articulation of ties of a social relationship among social units, like persons, households, organizations etc. which are called actors and the ties are links between the actors.
6. The contribution of unpaid family workers in the handloom sector of textile industry: A large section of workers concealed within the aggregate figures of self-employment, are unpaid family workers/helpers that are mostly female. They don't receive any independent payment/income but contribute their labour to the production. The main objectives of this project are, to find out proportion of unpaid workers among total workers in weaving and allied works.
7. To find out the share of income of the unpaid workers in the total income of the household from weaving and allied works. Time spent on different unpaid activities viz., handloom related works, domestic and extra-domestic works and also on other activities and leisure-time in a day.
8. To find out the association, if any, between unpaid work and factors like house hold size, number of children, number of female, amount of debt and some other socio-economic factors.
9. Contract farming participation and emerging trend in agrarian relations: Contract farming practice is not new in India. Both formal and informal forms of contracts or agreements in agriculture have been practiced since centuries (Eaton and Shepherd, 2001; Rao, 2008). However, this practice has gained momentum since early 2000s with new agricultural policy to have encouraged private participation in farming to boost production output and to ensure better market linkage for the products/commodities through retail supply chain by the concerned private agencies (Singh, 2005; Sharma, 2008; Gulati, Joshi and Landes, 2011). The farmers in the states like Punjab, Maharashtra, Karnataka, Madhya Pradesh and Tamil Nadu have increasingly adopted this neoliberal farming model in the recent time (Jain, n.a). The farmers in West Bengal also have embraced this new form of farming of late for growing

potatoes under Frito Lays model. While many consider this practice as a new agribusiness model or supply chain management, the sociologists' scope is to look into the new form of agrarian relations and the mode of production in the wake of contract farming (Singh, 2005; Key and Runsten, 1999). Sociologists' contribution to the studies on agrarian relation are abundant (Beteille, 1974; Mukherjee, 1981; Jha, 1991; Buch-Hansen and Marcussen, 1982). However, it was observed that there is a dearth of literature on the sociological perspectives of contract farming in India.

10. Gender segregation of occupations, with a focus on women in mining. The research will focus both on patterns of women's work participation in the mining industry and also on issues of data and measurement. Data on number of miners in India is collected by population Censuses, NSSO employment-unemployment surveys, Annual Survey of Industries and Director General of Mines Safety, among others. This project seeks to evaluate official statistics relating to the number of miners and their wages.
11. Problems of elderly women in the North Eastern States. This will include study social dynamics of aging, social security provisions for the elderly and abuse of the elderly in States of the North East.

Sampling and Official Statistics Unit

ACTIVITIES AND ACHIEVEMENTS DURING THE TWELVETH FIVE-YEAR PLAN (2012-2017).

The scientific workers of Sampling and Official Statistics Unit (SOSU) are extensively involved in research, teaching, training, consultancy and academic administration. The research activities are carried out at individual and unit levels. The unit runs several externally funded projects which has significant research elements. Research is being carried out in collaboration with different universities (Boston University in USA, Monash University in Australia, and LSE in UK), different government and private organizations, institutions (MOS&PI, DGCIS, RBI, SAIL/IISCO, CAGE/WARWICK, Directorate of Textiles, Government of West Bengal, Registrar General and Census Commissioner of India, State Finance Commission, Government of West Bengal.) The research output is published in peer reviewed national and international journals. SOSU scientific workers regularly take part in teaching the regular courses of the Institute like the B. Stat, M. Stat. M. Tech and ISEC courses. Research guidance is also provided to the research fellows of the institute and as well as of other institutes and universities.

The scientific workers of SOSU serve as members of editorial board journals and help in editorial collaboration. They are involved in academic administration and administrative works of the institute. They also serve in various committees formed by the Government and other academic bodies. National and international conferences/seminars are organised in regular manner.

The unit has organised several training programs for Government officials, both central and state, in areas of official statistics, basic and applied statistics.

FOCUS OF RESEARCH ACTIVITIES DURING TWELVETH FIVE YEAR PLAN (2012-2017).

The objective is to cater to the need of the government for analysing official statistics data useful for policy-making and socio-economic development, to introduce new courses in official statistics and specialised training for capacity building and continued research with focus on the following themes: Strategic Network Formation and Evolution, Corporate Social Responsibility, Trade data and indices, Regional poverty, Vulnerability, Analysis of NSS and Census data, Accountability of local Governments, Direct and Indirect Roles of Socio-Economic, Demographic, Health and Programmatic Factors in the Growth of Population, Poverty and aspiration, Socio-Economic Impact of highway construction, Currency demand estimation, Price statistics, Dependency Ratio, Pattern of Expenditures in Broad Categories of Food and Non-food Items by Varying Economic Status of Households in India, Pricing of Levy Driven Arithmetic Type Floating Asian Options, Stochastic Models for Political Business Cycle, Distributive Impacts of Agent-Intermediated Microcredit, Resource Transfers to Local Governments: Political Manipulation and Voting Patterns, Study on Self Help groups, Quality Consideration in Agricultural Markets, Measuring Outsourced Manufacturing Process Randomised response, Capturing variation in ageing of population, Labour absorption in workforce.

It is now time for a substantial increase in the staff strength of SOSU through new recruitments at all levels so as to be able to continue with the increasing volume of activities. Those with experience in official statistics are of prime importance.

Economic and Planning Unit

ACTIVITIES AND ACHIEVEMENTS DURING THE 12th FIVE YEAR PLAN PERIOD (2012-2017)

The Unit organizes an Annual Conference on Growth and Development every winter. This conference has grown into a major international conference on development economics with almost 200 participants from all over the world. The conference contributes significantly to the production and exchange of scientific knowledge as well as contributing to the international image of the Indian Statistical Institute. Faculty members from the unit were awarded international and national prizes during this period (Infosys Prize, 2012; Mahalanobis Memorial Gold Medal, 2014). A range of other international and national conferences were organized by the unit (11th meeting of the social choice and welfare society (2012), the Delhi Macroeconomics Workshop (annually since 2012), the IGC-ISI Annual Development Policy Conference). Various faculty members joined the editorial boards of prestigious journals in their field (Social Choice and Welfare, Mathematical Social Sciences, Indian Growth and Development Review).

FOCUS OF RESEARCH ACTIVITIES DURING THE 13th FIVE YEAR PLAN PERIOD (2017-2022).

The Economics and Planning Unit is one of the leading research centres in India and in the Asia-Pacific region for research and teaching in economics. Our goal in the next five years is to build on this foundation and turn our unit into one of the best economics departments in the world. In order to achieve this goal, the Economics and Planning Unit needs to hire top tier faculty with diverse skills and strengths and produce first rate Ph.D. students. Our goal is to institute a strong visiting program for young faculty who can contribute to our research environment but also supplement our teaching requirements. Therefore, we envision 5-6 young scholars at any point in time, some of whom, based on their performance, may go on to become faculty members.

Economic Analysis Unit

ACTIVITIES AND ACHIEVEMENTS DURING THE TWELFTH FIVE YEAR PLAN (2012-2017)

The Economic Analysis Unit of ISI Bangalore Centre remains a small Unit, with currently only two permanent faculty members (although we attempt to supplement this with regular visitors). However, the Unit has continued to focus on empirical research on problems of Indian development and with systematic work on official statistics.

Research

To mark the International Year of Statistics, in 2013, the Economic Analysis unit organised a day-long national seminar on Statistical Databases in Gram Panchayat. The participants in the event included Professor Abhijit Sen, Member of the Planning Commission, Dr Pronab Sen, Chief Statistician of India, Professor T. J. Rao, former head of the technical committee of the National Sample Survey Organisation, and Professor Thomas Isaac, author of Local Democracy and Development, the standard reference on the subject of information bases for panchayats and former Finance Minister of Kerala. The lead paper at the seminar has now been published as a book *A New Statistical Domain in India: An Enquiry into Village Panchayat Databases*, Tulika Books, 2016. The book is published in the Agrarian Studies Series of Tulika Books, of which V. K. Ramachandran is General Editor, who has written the foreword for the book. This book is a new and important contribution to the study of statistical databases of rural India.

The Unit undertook a project on Evaluating Official Statistics on Landholdings. (2013-14 to 2014-15). A National Consultation was held March 6, 2015. The invitees to the Consultation included Professor Ramesh Chand, Member of the Niti Aayog, Dr Pronab Sen, Chairperson of the National Statistical Commission, Professor Abhijit Sen, former Member of the Planning Commission and Professor, Centre for Economic Studies and Planning, Jawaharlal Nehru University, and Professor T. J. Rao. The lead paper at the Consultation based on the project findings (presented by the project linked person) was titled "Underestimation of The Extent of Operational Holdings of Land in India." This research shows that the aggregate extent of operated area estimated by the National Sample Survey of land and livestock Holdings in India is lower than the corresponding estimates from the Agricultural Census and the land Use statistics. Further, the discrepancy has increased over time. It showed that there is undercounting of the largest landholdings in the present methodology on account of sampling errors.

Dr. T. C. A. Anant, Secretary, Ministry of Statistics and Programme Implementation requested Madhura Swaminathan, on behalf of the National Statistical Commission, to prepare a note on Gender Gap in Statistics. She prepared A Note, and on the basis of these suggestions, the Ministry proposed a special seminar in 2015 on issues pertaining to gender statistics. Various recommendations were made including on improving data on women.

The Unit has begun a project on North East, specifically on Livelihoods, homestead farming and human development in Tripura. Central to this project are the evaluation and use of official statistics on land, agriculture, and human development in Tripura. Preliminary consultations have been held with the Office of the Chief Minister, Government of Tripura, and the Department of Agriculture, Horticulture and Planning.

The Unit continues its work on rural India, based on detailed statistical surveys. During this plan period, emphasis was given to the social and economic status of Scheduled Caste households in rural India, and the research resulted in a book, *Dalit households in Vii/age Economies* (edited by V. K. Ramachandran and Madhura Swaminathan), Tulika books, New Delhi, 2014.

Lastly, the Unit has begun work on issues related to climate change and agriculture, given the importance of the phenomenon of climate change. A one-day workshop for research students from south India was organised. Most recently, the Government of Karnataka has requested the Unit to undertake a study on climate change and agriculture.

Teaching

In terms of teaching, the Unit has successfully started a new JRF in Development Studies (2015-16), with an intake of five scholars. Regular teaching, as per the course outline approved by the Academic Council, has been undertaken during the two semesters.

FOCUS OF RESEARCH ACTIVITIES DURING 13TH FIVE YHEAR PLAN (2017-2022)

The study of development, with special emphasis on empirical research from an inter-disciplinary perspective, will be the main focus of research of the Unit. The specific areas of research focus will

be

- Evaluation of official statistics from a policy perspective
- Exploring social and economic problems of rural India through fieldwork-based statistical studies
- Continued focus on deprivation among Scheduled Castes, Scheduled Tribes
- Issues pertaining to women
- Climate change and sustainability
- Rural to rural and rural to urban migration

We need to upgrade and expand this Unit with more faculty members (at least five) in economics, economic history, sociology, development studies and statistics. This is for continuing with the teaching programme as well as to be able to undertake substantial research projects.