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Bangladesh-Based Research: Learning from a Multidisciplinary Academic Database

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Bangladesh-based Research: Learning from a Multidisciplinary Academic Database

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Abstract

This study investigates Bangladesh-based research since the country's independence, leveraging data from Scopus, a multidisciplinary academic database. The analysis focuses on Scopus-indexed documents that include the term "Bangladesh" in their titles. The key aspects examined include publication trends, leading authors, contributing institutions, prominent research fields, and major funding agencies. In addition, the study identifies challenges faced by the academic community in Bangladesh and highlights policies designed to foster research growth and improve the global academic presence of the country. The findings provide a comprehensive overview of Bangladesh's research landscape and serve as a foundation for future strategic initiatives to advance academic contributions.

Keywords: Bangladesh, Research, Academic Discipline, Funding Agency, Institute

1 Introduction

Bangladesh has witnessed remarkable growth in academic research over the decades, with a consistent increase in publications that address its diverse development challenges. The evolution of Bangladesh-based research highlights the growing global recognition of the country's academic potential and relevance in various fields. From healthcare to engineering and environmental sciences, research contributions have reflected a balance between addressing local issues and contributing to global knowledge. However, this growth also underscores the need for strategic policies to address key challenges in fostering sustainable academic progress.

This study investigates Bangladesh-based research since the country's independence, leveraging data from Scopus [1], a multidisciplinary academic database. The analysis focuses on Scopus-indexed documents that include the term 'Bangladesh' in their titles.

It is worth mentioning that there are many academic databases that can provide relevant data for analysis. See [2-4] for more details. As many authors articulated, the most useful ones are Web of Science, PubMed, and Scopus. However, Web of Science (WoS) is a Clarivate multidisciplinary academic database that provides access to high-quality

scholarly content from over 21,500 journals, conference proceedings, and other sources in fields such as science, social sciences, arts, and humanities. It specializes in citation tracking and impact analysis, offering tools like the Journal Impact Factor (JIF) and detailed citation reports. Web of Science supports robust search and filtering options to analyze research trends and identify influential works. Its curated content and citation metrics make it a trusted resource to assess research quality and academic influence. PubMed is a free biomedical and life sciences database maintained by the U.S. National Library of Medicine, offering access to over 35 million citations from peer-reviewed journals, books, and other resources. It specializes in fields such as medicine, healthcare, biology, and related disciplines, providing links to full-text articles when available. Although PubMed lacks built-in citation tracking or advanced metrics, it excels as a comprehensive source of high-quality biomedical research. Its robust indexing and user-friendly interface make it a vital tool for researchers, healthcare professionals, and policymakers in the life sciences. However, Scopus is an Elsevier multidisciplinary academic database that offers access to more than 25 million documents from more than 25,000 sources, including peer-reviewed journals, books, and conference papers in fields such as science, technology, medicine, social sciences, arts, and humanities. It provides tools for citation tracking, research metrics, and author profiling, enabling researchers to analyze trends and evaluate academic impact. However, in this study, Scopus is preferred over PubMed and Web of Science for its broader multidisciplinary coverage, indexing over 25,000 sources across science, technology, medicine, social sciences, arts, and humanities. It offers various types of documents, including journals, books, conference proceedings, and patents, unlike PubMed's biomedical focus and Web of Science's emphasis on journals. Scopus provides advanced research metrics such as CiteScore, SNIP, and SJR, along with robust author and institutional profiling tools for detailed analysis. Its international and regional representation exceeds PubMed's US-centric focus and complements the global reach of Web of Science with greater inclusivity. These features make Scopus the ideal choice for multidisciplinary research and comprehensive impact analysis.

Based on the above considerations, this article focuses on Scopus-indexed documents that include the term 'Bangladesh' in their title. Consequently, the rest of this article deals with publication trends, leading authors, contributing institutions, prominent research fields, and major funding agencies. In addition, the study identifies challenges faced by the academic community in Bangladesh and highlights policies designed to foster research growth and improve the global academic presence of the country.

2 Trend

Figure 1 shows the trend of publications with 'Bangladesh' [1] in the title from 1972 to 2024. As seen in Figure 1, Bangladesh has gained significant attention in academic research over the decades. This trend could be influenced by increased global collaboration, development challenges, and international recognition of Bangladesh's growing relevance in various research fields. The stages of steady growth, accelerated growth, peak, decline, and overall trends are summarized below.

Steady Growth (1972–2000): From 1972 to the late 1990s, the number of publications remained relatively low but showed a gradual increase. This indicates a slow but consistent

interest in research related to Bangladesh. Accelerated Growth (2000–2020): Starting in the early 2000s, there was a noticeable increase in publications. Growth increased more rapidly after 2010, indicating a surge in research output during this period. Peak Around 2020: The number of publications peaked significantly in 2020, reaching more than 3000. This may reflect a greater interest in research or specific global events that brought attention to Bangladesh. Slight Decline (2021-2024): After 2020, there is a slight decline in publications, although the numbers remain higher than in earlier years. This might suggest a stabilization or a change in research trends. Overall Trend: The graph in Figure 1 shows an exponential increase in publications over time, with the most dramatic growth occurring after 2010.

The search is expanded to title, abstract, and keywords. In this case, the number of research items has increased as shown in Figure 2. But the overall trend remains the same.

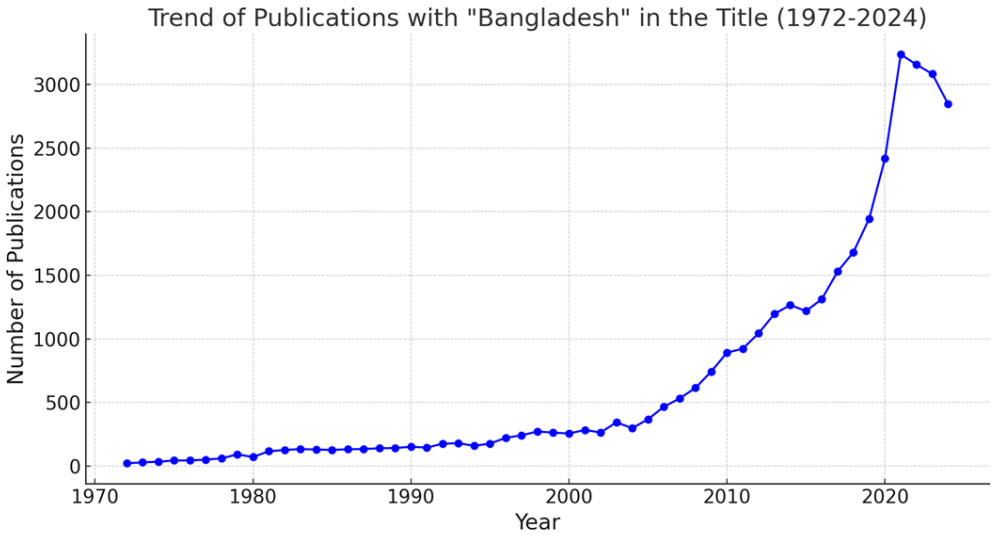

Figure 1: Overall Trend in Bangladesh-based Research (Bangladesh in Title).

3 Document Types

Figure 3 shows the distribution of document types in Bangladesh-related research on a logarithmic scale. The publications with 'Bangladesh' in the title from 1972 to 2024 are considered. The key observations are as follows. The contributions clearly show a hierarchical distribution, with articles vastly outnumbering other types. Conference papers and book chapters are significant but much smaller. Reviews, letters, and notes offer additional but reduced contributions, while specialized formats such as data papers and errata play niche roles. Conference reviews appear to be negligible in comparison. This distribution reflects a strong emphasis on the dissemination of original research (articles) and the sharing of knowledge through conferences.

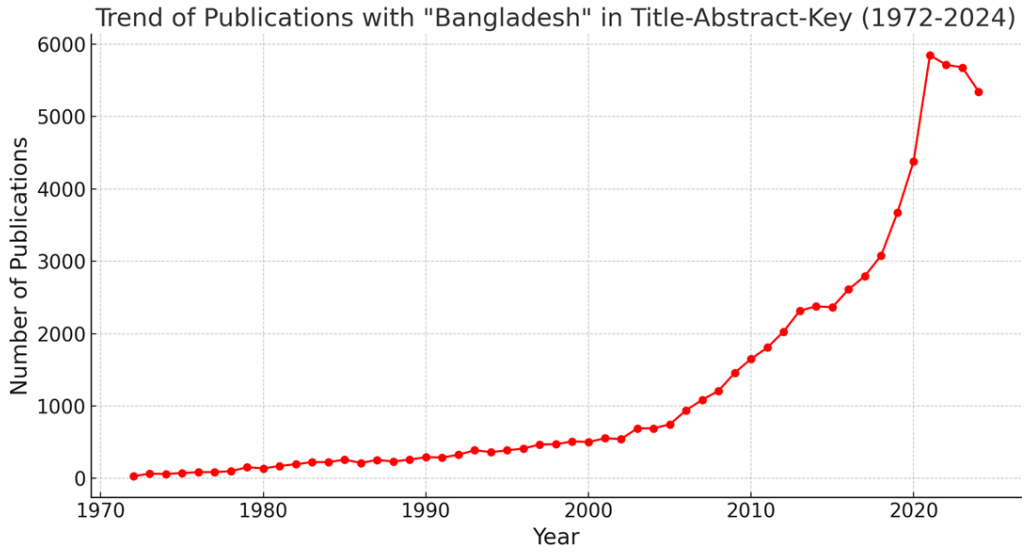

Figure 2: Overall Trend in Bangladesh-based Research (Bangladesh in Title-Abstract-Keywords).

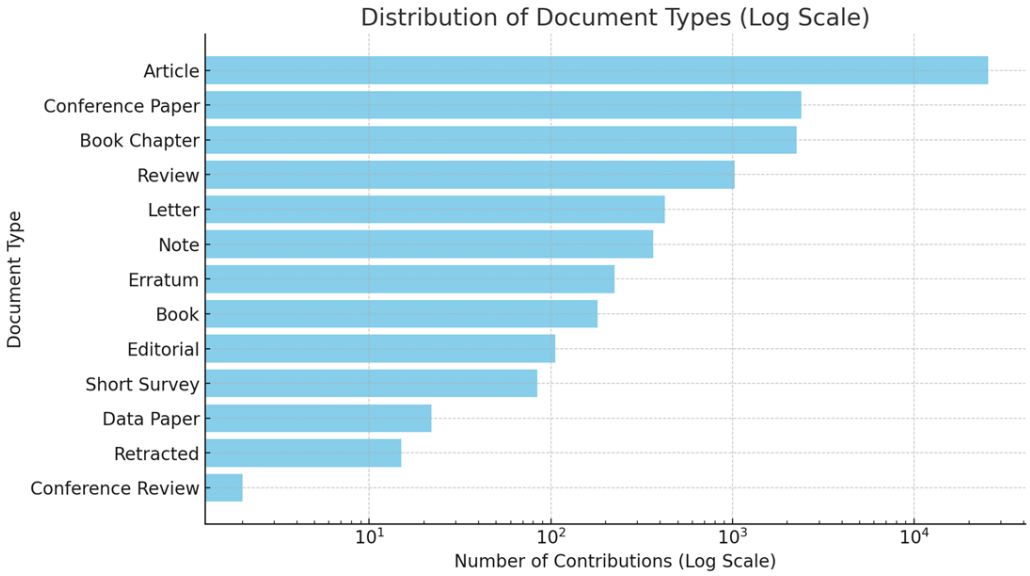

Figure 3: Distribution of document types.

4 Institutions

Figure 4 summarizes the contributions of various Bangladeshi institutions (only the top ten) to research publications. University of Dhaka: Leads with the highest number of contributions, surpassing 3,000, indicating its dominant role in research output in Bangladesh. ICDDR,B (International Center for Diarrheal Disease Research, Bangladesh): The second largest contributor, with a significant focus on health and disease-related research. Bangladesh Agricultural University (BAU): Ranked third, reflecting its contributions to agricultural and environmental research. University of Rajshahi: A major player in research, closely following BAU in the number of contributions. Jahangirnagar University (JU): Shows a strong presence in research, placed after Rajshahi. University of Chittagong: Contributes significantly, though less than JU, reflecting its research influence in specific domains. Bangladesh University of Engineering and Technology (BUET): Focuses on engineering and technology related research, contributing a moderate number of publications. BRAC University: A private university with notable research contributions that emphasizes development and innovation. Shahjalal University of Science and Technology (SUST): Contributes significantly, highlighting its role in science and technology research. Khulna University (KU): Rounds out the list with a notable but smaller contribution compared to the leading institutions.

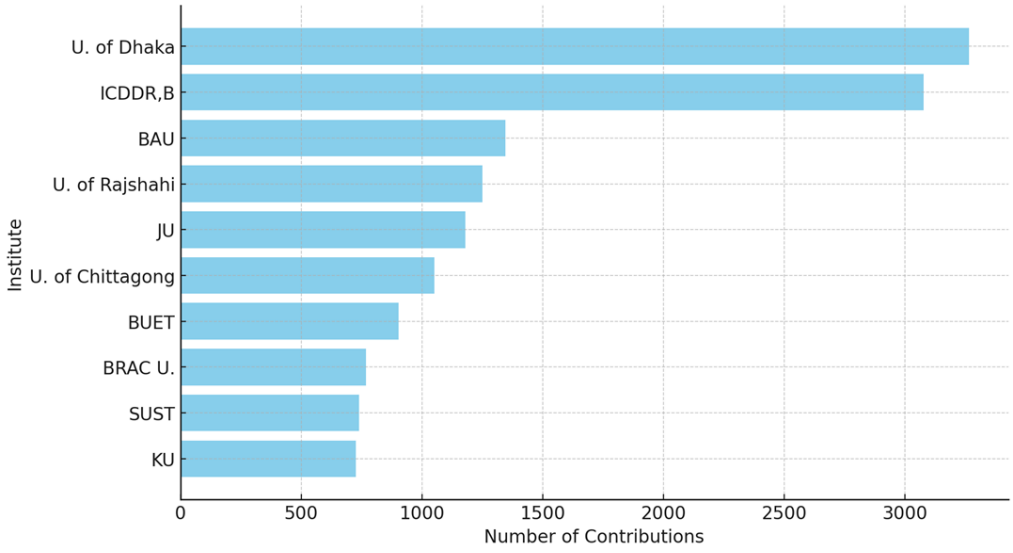

Figure 4: Institution-wise contributions.

5 Authors

Figure 5 shows the top 10 authors by contribution to Bangladesh-related research, ranked by the number of their titles. They are as follows: Ahmed, T.: Leads the list with over 300 contributions, indicating a significant influence in research output. Luby, S.P.: The second most prolific author, contributing slightly less than Ahmed, T., but still over 250

publications. Faruque, A.S.G.: Ranks third with around 200 contributions, showcasing substantial involvement in academic research. Rahmatullah, M.: Following closely, this author has just under 200 contributions, maintaining a prominent role in research. Qadri, F.: Contributed similarly to Rahmatullah, M., indicating an active research profile. Ahmed, K.M.: With over 150 contributions, Ahmed, K.M. is another key contributor to the research community. Haque, R.: Matches Ahmed, K.M.'s contributions, emphasizing their consistent research output. Baqui, A.H.: Slightly fewer contributions compared to Haque, R., but still a prominent author with over 100 publications. Chisti, M.J.: Maintains a significant presence in the research field with over 100 contributions. Gurley, E.S.: Rounds out the list with contributions nearing those of Chisti, M.J., reflecting consistent research activity. Figure 5 underscores the remarkable contributions of these authors, with Ahmed, T. and Luby, S.P. leading by a considerable margin. Their collective work highlights the strong individual roles in the advancement of Bangladesh-related research, especially in health, development, and applied sciences. The distribution also suggests a well-recognized and active community of researchers.

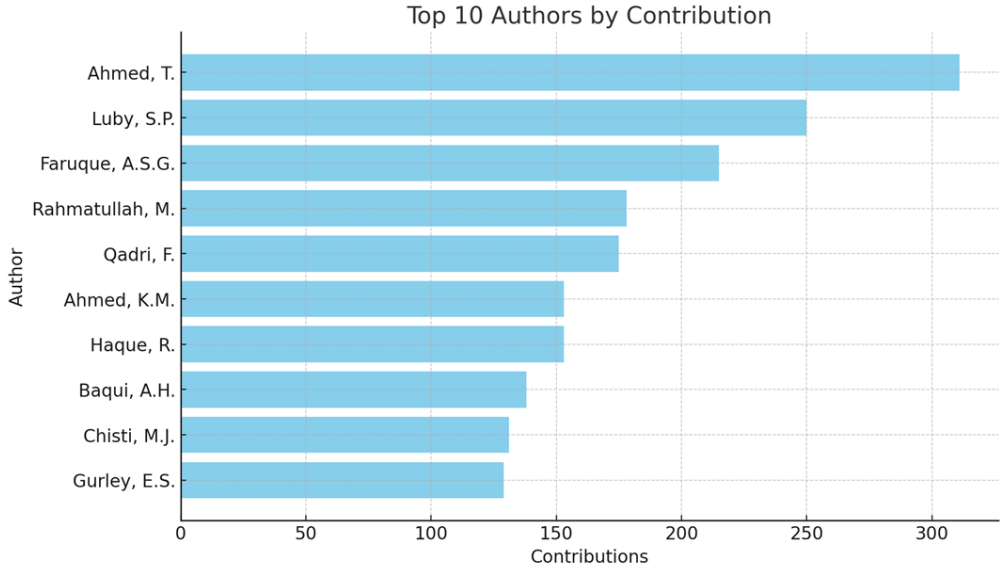

Figure 5: Author-wise contributions.

6 Research Fields

Figure 6 shows the top 10 fields by contribution to Bangladesh-related research, highlighting their prominence in academic output. The list is as follows: Medicine: The leading field with the highest number of contributions, reflecting a strong focus on healthcare and medical studies. Social Sciences: Second only to medicine, this indicates substantial research activity in societal and cultural studies. Environmental Science: Holds a prominent position, showcasing attention to environmental issues and sustainability. Agricultural and Biological Sciences: Reflects a significant focus on agriculture, biology and related fields, essential for a predominantly agrarian economy like Bangladesh.

Earth and Planetary Sciences: Indicates considerable research in geology, climate, and planetary studies. Engineering: Demonstrates substantial contributions, highlighting the application of technology and innovation to address challenges. Economics, Econometrics, and Finance: Reflects research on financial systems, economic policies, and development economics, which are critical to the growth of the nation. Business, Management, and Accounting: Emphasizes research in organizational strategies, management practices, and financial reporting. Computer Science: Indicates growing contributions in technology, artificial intelligence, and computational sciences. Energy: Highlights research on energy production, sustainability, and related technologies. In summary, the medicine and social sciences dominate the research related to Bangladesh, followed by the environmental and agricultural sciences. Engineering, economics, and computer science also contribute significantly, showing a balance between addressing social challenges and advancing technological and scientific innovations. This distribution underscores a multidisciplinary approach to research efforts.

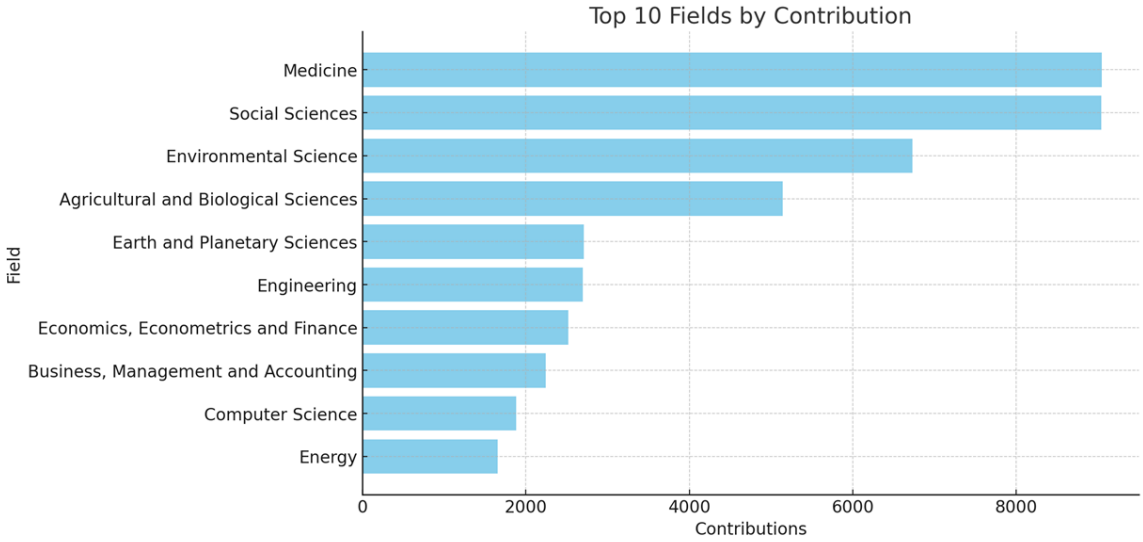

Figure 6: Field-wise contributions.

7 Document Origins

Out of the 37,739 documents indexed in Scopus (Figure 1), 61. 77% originated in Bangladesh, while 38. 23% originated in other countries (Figure 7). The pie chart shown in Figure 7 shows the origin of publications on Bangladesh-related research, showing contributions by country. United States: Leads with the highest number of publications (5,914), reflecting its dominant role in producing Bangladesh-focused research. United Kingdom: The second largest contributor, with 3,227 publications, shows its strong academic ties to Bangladesh. Australia: Ranks third with 3,183 contributions, indicating significant research interest from Australian institutions. Japan: With 2,104 publications, Japan plays an substantial role in contributing to Bangladesh-related research, particu-

larly in collaborative and technical fields. Malaysia: Contributes 1,409 publications, reflecting growing academic collaboration with Bangladesh in recent years. India: Close to Malaysia with 1,261 publications, highlighting its regional proximity and shared interests. Canada: Accounts for 1,170 publications, demonstrating steady research contributions. Germany: With 881 publications, Germany contributes moderately, focusing on scientific and technological aspects. China: Contributes 848 publications, indicating growing interest in collaboration and studies related to Bangladesh. In synopsis, the United States, the United Kingdom and Australia dominate in terms of Bangladesh-focused research publications, while Japan and Malaysia also make significant contributions. These patterns indicate strong academic collaboration across continents, with regional players like India and China actively participating.

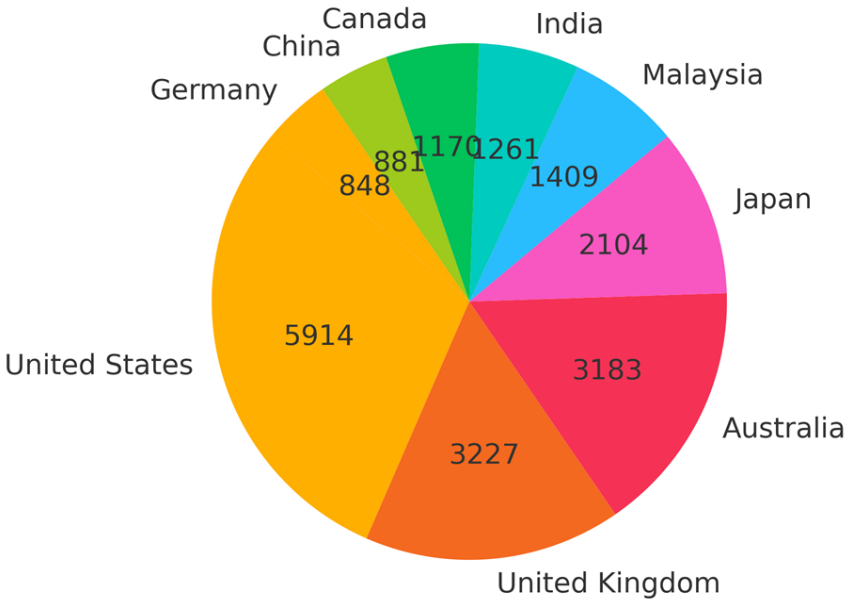

Figure 7: Distribution of document origins.

8 Funding Agencies

The pie chart in Figure 8 shows the contributions of the major funding agencies to Bangladesh-related research, highlighting the distribution of support from various organizations. USAID: The largest contributor, with 586 projects funded, reflecting a significant focus on development and humanitarian support. NIH (National Institutes of Health): The second largest contributor, funding 542 projects focused on healthcare and biomedical research. Gates Foundation: Funds 483 projects, demonstrating its commitment to health, education, and development initiatives in Bangladesh. US HHS (United States Department of Health and Human Services): Supports 403 projects, further emphasizing the participation of the US in health-related research. JSPS (Japan Society for the Promotion of Science): Provides funding for 375 projects, reflecting Japan's focus on academic and scientific collaboration. DFID (Department for International Development): Funds 308 projects, focusing on development-oriented research in Bangladesh.

Bangladesh MoST (Ministry of Science and Technology): Contributes to 242 projects, highlighting domestic efforts in promoting scientific research. MEXT (Ministry of Education, Culture, Sports, Science and Technology, Japan): Funds 235 projects, demonstrating Japan's role in educational and scientific research collaboration. NIAID (National Institute of Allergy and Infectious Diseases): Provides funding for 204 projects that focus on infectious diseases and health concerns. SIDA (Swedish International Development Cooperation Agency): Funds 230 projects, showcasing Sweden's involvement in development and research.

In synopsis, the chart highlights the dominant role of US agencies such as USAID, NIH, and HHS, alongside significant contributions from global organizations like the Gates Foundation, JSPS, and DFID. Domestic and regional players such as the Bangladesh Ministry of Science and Technology and MEXT also play a substantial role in the advancement of research initiatives. This distribution reflects a collaborative effort between international and local agencies to address Bangladesh's development and research priorities.

As seen in Figure 8, several key Japanese funding agencies are notable for their contributions. Japan Society for the Promotion of Science (JSPS) is Japan's largest contributor, with 375 contributions. JSPS supports scientific research across various disciplines and fosters international collaboration. Ministry of Education, Culture, Sports, Science and Technology (MEXT) is another major Japanese organization, contributing 235 times. It plays a critical role in the advancement of science education and research in Japan. Japan International Cooperation Agency (JICA) contributed 35 times, focusing on international cooperation and development programs, particularly in areas such as education and healthcare. Japan Agency for Medical Research and Development (AMED) made 18 contributions, primarily funding medical research and innovation. In general, Japan contributes significantly to Bangladeshi research, with the greatest support from its government-backed agencies, focusing on scientific advancement and international collaboration.

9 Policy Recommendations and Conclusions

The following policies can be recommended based on the finding illustrated in Figures 1-8.

Policy 1: Discourage review papers; prioritize original research and conference publications leading to impactful articles. The current landscape of Bangladesh-based research highlights the dominance of original research articles, which vastly outnumber other document types such as reviews, letters, and notes. This trend underscores the importance of prioritizing impactful, original studies and conference publications that contribute new knowledge rather than reiterating existing findings. By focusing on original research, the academic community can foster innovation and ensure that resources are allocated to projects with tangible outcomes. Encouraging high-quality conference publications further enables the dissemination of cutting-edge findings in a timely manner, promoting dynamic academic discussions and collaborations.

Policy 2: Establish dedicated research centers to promote focused, area-based research

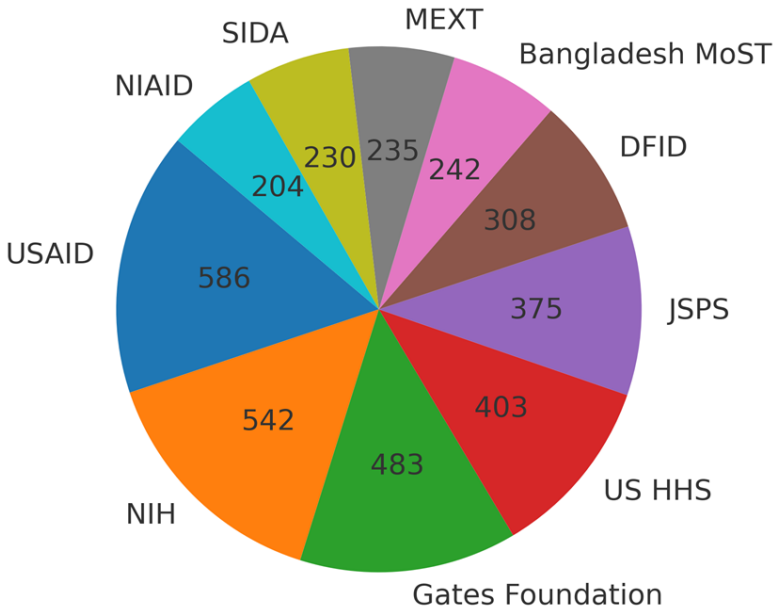

Figure 8: Distribution of funding agencies.

with appropriate and sustainable funding. The contributions of top Bangladeshi institutions, such as the University of Dhaka and the ICDDR,B, reveal the critical role of well-established centers in driving research excellence. The dominance of these institutions suggests the value of creating specialized research centers geared to specific disciplines or regional needs. Establishing dedicated research centers can improve area-based research, providing the infrastructure and resources necessary for sustained academic output. Sustainable funding mechanisms are essential to support these centers, allowing them to address pressing local and global challenges effectively.

Policy 3: Foster research collaboration between Dhaka-based and non-Dhaka-based institutions to enhance knowledge sharing and collective advancements. The variation in contributions between institutions across Bangladesh highlights the potential for collaboration between Dhaka-based leaders, such as the University of Dhaka, and institutions in other regions, such as the Rajshahi and Khulna universities. Such partnerships can bridge resource and expertise gaps, enabling collective advances in research. Fostering a network of collaboration between central and regional institutions can enhance knowledge sharing, strengthen research capacity throughout the country, and promote balanced academic growth throughout the country.

Policy 4: Foster engineering research through innovation, collaboration, and adequate resources. Engineering research has become a significant contributor to Bangladesh's academic output, demonstrating the potential of the field to address technological and social challenges. Promoting engineering research through innovation, collaborative initiatives, and appropriate resource allocation can enable the development of practical solutions to critical problems. Support for interdisciplinary collaborations between engineering and other fields can further amplify its impact, driving progress in areas like smart manufacturing, environmental sustainability, and energy solutions.

Policy 5: Recognize the best contributing authors with appropriate remuneration and public recognition to encourage excellence in research and publication. The remarkable contributions of leading authors, such as Ahmed, T., and Luby, S.P., emphasize the value of individual efforts in advancing research. Recognizing the best contributors through financial remuneration, awards, and public recognition can motivate researchers to maintain high levels of productivity and quality. Celebrating these achievements also inspires younger researchers and highlights the importance of individual excellence within the broader academic community.

Policy 6: NBRJ may encourage collaboration with relevant academic societies in Bangladesh to enhance participation and participation in various fields. Collaboration with academic societies in Bangladesh can expand the scope and reach of research activities, involving a broader range of disciplines and stakeholders. The Network of Bangladeshi Researchers in Japan (NBRJ) is well-positioned to facilitate such partnerships, leveraging its international presence and resources. By fostering ties with domestic academic societies, NBRJ can promote multidisciplinary research initiatives, increase participation in collaborative projects, and drive advancements in diverse fields.

These policies provide a strategic framework for advancing Bangladesh-based research, ensuring sustainable growth, fostering collaboration, and promoting excellence in academic contributions. Through their implementation, the research community can address global and local challenges more effectively while elevating the academic stature of Bangladesh on the international stage.

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