Proposed 2026 DOST-NRCP R&D Budget of P550M for "unique" programs to support the following:

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January 18, 2026

A. Massive R&D Capacity Building Projects (expanded version of ongoing NRCP CASCADE short course R&D training program) - P100M

B. Integrated, Holistic Regional R&D Programs (along SDG priorities and new NIBRA themes in DOST-NRCP Lighthouse Document) - P400M

C. R&D Administration, Management, Monitoring, Evaluation, Synthesis and Reporting (includes R&D management training program for staff) - P50M

Background and Rationale, Objectives, Expected Outputs and Outcomes

- There is an urgent need nationwide to upgrade basic R&D proficiencies, competencies and skills (PCS); in "K&K" (Knowledge - concepts and principles, and Knowhow - "praxis" or "learning by doing"), in all R&D areas and their underlying disciplines; in the SUCs, HEIs, and government research centers. This is evidenced by a relatively low scientific publication rate, low productivity of FREs (Full-time Research Equivalents, MS and PhDs), low MS and PhD graduation rates in HEIs, compared with ASEAN countries.

- DOST-NRCP is the only organization able to undertake this proposed massive R&D training program, being the largest research organization with >7,500 members vetted through a rigorous NRCP nomination and evaluation process. Members are located in different regions nationwide, members are at the senior, advanced, middle, and junior career levels; these researchers are a rich source of competent teachers and trainers, and also a rich source of trainees with great potential to pursue high quality R&D. Training would significantly improve R&D capacity and increase opportunities for R&D collaborations nationwide.

- Further, DOST-NRCP is unique in that its thirteen disciplinal divisions span the entire range of human knowledge, from the natural sciences and engineering, to the social sciences, and to the arts, culture and the humanities. Thus, holistic, integrative R&D programs that would benefit regional communities could be effectively undertaken.

- R&D Capacity Building would be considered a major public duty and responsibility, an important form of public service, of NRCP members to the nation. Considering the serious problems besetting the country in all major areas of national and regional development, the NIBRA (National Integrated Basic R&D Agenda) priorities are regularly reassessed and updated by the DOST-NRCP to address problems and challenges of the present and the future.

- With the proposed R&D training program, aside from "WHAT" R&D to pursue (NIBRA), NRCP would build a high quality R&D workforce (identify "WHO" to lead and undertake the R&D, and "HOW" to pursue it with a high level of PCSs) to undertake the DOST-NRCP R&D programs that would be funded under the NIBRA priorities.

- New technological developments such as DML and AI technology, IoT, ICT, digital connectivity and integration, allow faster, more efficient, effective and affordable R&D teaching and training and also more productive R&D collaborations. These cross-cutting technologies would be a top priority area of R&D training of the entire NRCP community.

- The main goal and expected output of the proposed program are massive training of researchers nationwide under recognized expert researchers working in leading Philippine SUCs, HEIs and DOST research institutes, in major research areas in the physical, natural, engineering and computational sciences, socio-political, cultural-historical, literary, arts and creative fields, with issuance of NRCP-R&D trainer group certificates of PCSs to the trainees, eventually leading to the establishment of a national R&D training micro-credentialing system recognized by CHED.

- There is a strong correlation between GDP and GERD (Gross Expenditure for R&D); furthermore, regional GERD invested in regional R&D HCD (human capital development) can be correlated with the GDP per capita of a region. The expected outcomes are: significant increases in the quantity and quality of researchers, research publications and other R&D output, MS and PhD graduates, R&D collaborations between trainer and trainee individuals and groups in different institutions and regions, and R&D-based innovations. Over the longer term, significant increases in regional GDP per capita correlated with LGU-led, R&D-driven growth and development, could be realized.

- This proposal directly addresses the implementation of programs to achieve the targets and goals of the Executive Branch: PDP 2022-2028, *Ambisyon Natin* 2040, the NIASD and PSAC Sectors, focused on the foundational requirement to train thousands more Filipinos (TEACH THE TEACHERS, TRAIN THE RESEARCHERS) in all major areas of S&T and R&D required for national and regional growth and development. We would aim have to achieve a cascade, multiplier, amplification effect of acquired PCSs (proficiencies, competencies and skills) all over the country.

A. Massive R&D Capacity Building (Education and Training - expanded CASCADE) - P100M

Course Categories, Content, Pedagogy, Implementation

A1. Course Categories

*There would be two categories of R&D training on:

1. cross-cutting technologies, and

2. specialized applied research and creative work.

Examples of cross-cutting technologies such as, but not limited to:

Artificial Intelligence, Deep Machine Learning and Data Sciences; Mathematical, Theoretical Design and Computational Modeling Sciences; Statistical Analysis and Validation for Socio-Cultural, Physical and Biological Sciences; Energy and Energy Storage Engineering Sciences; Materials Engineering Sciences, Critical Minerals Extraction and Refinement Engineering; Polymer Synthesis; Bio-organic and Inorganic Synthesis; Waste Segregation, Processing and Recycling Engineering Sciences; Terrestrial and Marine Environmental Assessment and Ecosystems Monitoring; Abiotic Air, Water and Soil Quality and Weather Sciences; Terrestrial and Marine Biodiversity Taxonomy, Documentation and Conservation; Terrestrial and Marine Natural Products Chemistry and Bioassays; Microbial Diversity and Interactions; OMICS1: Genetics, Genomics and Transcriptomics; OMICS2: Metabolomics, Peptidomics, Proteomics and Glycomics; Agriculture, Food and Nutrition Sciences; Physico-Chemical Technologies for Archaeological, Historical, Cultural Research and Arts and Creative Work; Linguistics, Literary, Effective Communication Research for Public Dissemination; Socio-Political Research Methods, Research Evidence-based Policymaking.

Examples of specialized applied research and creative work, but not limited to:

Assembly of Drones, Engineering of Embodied/Physical and Virtual AI Agents; Predictive Mathematical and Computational Modeling for Environmental and Health Applications; 3D Printing and Additive Manufacturing of New Materials; Steel-based Machine/Mechanical Engineering and Manufacturing; Disease Targets in Humans (cancer, infections, mental and behavioral illnesses, stress-related conditions; lifestyle-linked chronic diseases); Public Health Issues; Physiological, Cellular and Molecular Targets in Plants and Animals for Varietal Improvement and Protection; Infectious Disease Diagnostics and Therapeutics Development; New Agriculture, Agronomy, Biofertilizers and Greenhouse Technologies; Research Writing, Public Communication and Dissemination Methods; Management and Monitoring of Specific Ecosystems; Technology-driven Political Governance Models for Inclusive Growth and Development in LGUs/Local Communities.

- ❖ Each Division Chair would be requested to suggest topics for the two categories, or to select priorities from those listed above.
- ❖ GP Concepcion could provide the list of expert training groups for these categories in leading institutions.

A2. Course Syllabus and Modules: Teaching Materials for trainees to obtain working knowledge

- course conducted in 3-5 modules each with 2 parts, each with sections, based on the subtopics/units of the short course

Part 1 on Knowledge

For each module of a subtopic/unit,

- sections on: concepts and principles in text; to demonstrate them, figures, tables, schemes, equations; qualitative examples, quantitative examples, calculations, case studies, problem sets or exercises, journal article assignment with data analysis, etc.
- all modules of Part 1 on Knowledge can be implemented online
- student must keep resubmitting written work or improving recitation until performance is satisfactory (my way with my students whom I guide towards self-improvement)
- student gets a score for Part 1 on Knowledge for each module.

Part 2 on Knowhow

- experiments/activities/exercises (rationale, objectives, protocols, procedures, and materials) used to be demonstrated by teaching staff who guides and scores the student for his show of interest and good answers to the staff's questions
- actual experiments/activities/exercises (rationale, objectives, protocols, procedures, and materials) to be performed by student; agile use of instruments and competent performance
- quality of data, analysis and discussion of results presented in a report are made the major basis for the score in Part 2 on Knowhow.

A3. Course Completion Requirements, Evaluation and Certification System

- student attends KNOWLEDGE Part 1 of modules online, attendance is noted and given a score
- student attends KNOWHOW Part 2 of modules in person, attendance is noted and given a score

- surprise quizzes, short exams and all activities online and in person provide additional basis for evaluations and helps ensure attendance and accurate evaluation
- require reports, e.g., lab experiment report, which serve as good practice for draft publication, as a completion requirement
- if performance is satisfactory, issue a certification of completion and proficiency signed jointly by NRCP official and Project Leader (with Institutional Affiliation indicated)
- eventually aim to standardize the training course for CHED Micro-credential Certification and Credits

(Refer to Annex A: Implementation Plan)

B. Nationwide Integrated/Holistic Regional R&D Programs (along SDG priorities and new NIBRA themes in Lighthouse Document) - P400M

B1. Fundamental Principles of Progressive R&D and Strategy of Regional Inclusivity and Equity as in A above apply

- provide equitable opportunities to different regions of the country
- divide the country into groups of regions/provinces and allocate funds for 13 research programs in the 13 regional groups as follows:

  4 regional groups in Mindanao: Western, Central and Eastern, or Northern, Central and Southern; and BARMM

  3 regional groups in the Visayas: Western, Central and Eastern

  3 regional groups in Luzon: Northern, Central, and Southern and MIMAROPA

  3 regional groups in NCR

- 13 regional groups in all; let NRCP decide the demarcations of the groups; regions and provinces included in a group
- each research program will consist of 5 projects covering 5 groups of the 7 groups of the new 14 NIBRA priorities research areas grouped into 7 R&D Clusters as follows:

  NIBRA Cluster 1: ARAL (education), GABAY (socio-political governance and leadership at national, regional, LGU levels – law, policy, ordinance mentoring, crafting of bills, policies, ordinances, IRRs)

  NIBRA Cluster 2: ATIN (Philippine arts, culture and heritage), LAKBAY (eco-socio-cultural-historical, agri-eco-culinary tourism)

NIBRA Cluster 3: DUNONG (blue skies, theoretical, computational modeling), LIYAB (cross-cutting FIRE5 technologies, AI, digital sciences and transformation, ICT, IoT, OMICS – genomics, transcriptomics, metabolomics)

NIBRA Cluster 4: SAKLAW (DRRM, climate change actions, environmental management, waste and materials recylcing and alternative use), LIGTAS (human and territorial security, cybersecurity, defense)

NIBRA Cluster 5: SAPAT (food, agriculture, fisheries and livestock, livelihood), TUBIG (water resources management, potable drinking water)

NIBRA Cluster 6: LAKAS (renewable energy, energy resources regulation and management), METAL (green critical minerals, metallurgical engineering, semiconductor micro and nanotechnology, nanocomposite materials)

NIBRA Cluster 7: BUHAY (one health for humans, plants and animals, medical and veterinary and allied health training focused on preventive health and wellness, diagnostic and monitoring methods, pharmaceutical and drug development, LIKAS (biodiversity documentation, conservation and management for agricultural, health and industrial applications)

- all research programs are required to include Group 1 on ARAL (education and training) and GABAY (governance) as one project and this would involve the LGU/s and the leading SUC/s in the locality or area of study

- all research programs will pursue an inter-disciplinary, trans-disciplinary, holistic, integrative approach, closely inter-relating the implementation of the 5 projects, relevant to the delivery of basic goods and services required in the particular region, providing solutions to important needs and problems, and pursuing unique opportunities for growth and development in the region

- there will be a maximum budget or budget cap for each research program from the 13 groups of regions in L-V-M-NCR; each research program proposal will have a budget cap of P10M/year for 3 years, for a total of P30M; consisting of 5 projects, at ~P2M/year for each project; one project may have a bigger budget than another, e.g., an energy or metallurgy project may require a bigger budget than a computational design or theoretical project

- every year, 13 projects will be approved for P30M for 3 years at P10M/year; total R&D budget allocation per year is ~P390-400M

- schedule for call for research program proposals, deadline for submission, presentation and evaluation of proposals will be staggered throughout the year; e.g., January onwards for all proposals for Western and Central Mindanao; February onwards for Eastern Mindanao and BARMM; March onwards for Western Visayas and Central Visayas; April onwards for Eastern Visayas and Northern Luzon; May onwards for Central Luzon and Southern Luzon; June onwards for NCR

- encourage regions/provinces through a massive campaign in the NRCP L-V-M clusters, to submit at least 3 research program proposals per group, and these proposals will be pitted and competed against each other only within the group of regions/provinces; e.g., the best of 3 submissions will be chosen for Eastern Mindanao; the best of 3 submissions will be chosen for BARMM, etc.; proposals from different groups of regions/provinces will not compete with one another

- above is a fair, equitable, inclusive strategy for allocation of R&D funds to the different regions/provinces of the country; NRCP would focus on LGU-based regional development and social/societal innovation

B2. Research program and project leaders and collaborators

- program leader would be a published researcher (at least 5 publications), a respected research leader in the proposed program's field/s of study, with strong research management skills

- project leaders would be published researchers (at least 3 publications), recognized research leaders in the proposed project/s field of study

- preferably, the program leader would be a faculty/researcher from a SUC or HEI from the region where the research will be conducted; and if not, one or two project leaders would be from the region

- collaborations with non-NRCP members, whether local or foreign-based, e.g., from NAST or PAASE, is strongly encouraged

- collaborations between/among the institutions of the program and project leaders is strongly encouraged, i.e., research staff of the project leader based in the regional SUC are encouraged to pursue postgraduate studies in the program leader's university, co-mentored/co-advised by the two research leaders, pursuing a thesis topic within the research program, completed preferably within the 3 years of the program

- NRCP would provide information on all completed, ongoing and newly approved NRCP projects in each of the 13 groups of regions/provinces, so that they can be integrated with these new, holistic programs; e.g., completed projects would provide scientific data/evidence as basis for the formulation of local ordinances, policies, under the GABAY project of the program, and implementation of the ordinance would then be monitored

B3. Research program evaluation and monitoring teams

- ensure expert-level evaluation and approval of proposals and monitoring of project implementation over three years; it would be unwise to assign technical panel chair to GB members/division chairs whose expertise do not necessarily match the programs' scope of study; problem also arises when division chair's/GB member's term ends before the research program is completed

- create 13 Inter-disciplinary Evaluation and Monitoring Teams (IEMTs) of 5 members with expert-level credentials (publications), with no conflict of interest, with specific knowledge of and interest in the growth and development of the region/province; select from NRCP Member Emeriti, NRCP Achievement Awardees, senior NRCP members based on area of expertise; practice the principle of expert external review - invite NAST members, PAASE members, Professor Emeriti, senior or retired professors from leading universities, to join the IEMTs

B4. Standard Requirements of R&D Program

*****as described in Section A and SOPs used for NRCP R&D proposals and funded programs would apply

C. R&D Administration, Management, Monitoring, Evaluation, Synthesis and Reporting - P50M

*NRCP would screen and hire more Science Research Specialists (SRSs), upgrade credentials to competently manage the two categories of projects

*NRCP would upgrade the compensation package and benefits of the SRSs

*SRSs would undergo regular training to upgrade knowledge and understanding of the science itself, i.e., the scientific content /substance of proposals; aside from doing procedural, formalistic (form versus content) monitoring of projects

*SRSs would undergo training on advanced digital technology and AI governance and ethics

*SRSs would be encouraged to pursue Masters and PhD degrees

*NRCP would provide orientation and guidance to the IEMT members on the conduct of their evaluation and monitoring, their duties and responsibilities

*NRCP would provide fair, attractive compensation to the members of the IEMTs for serviced rendered to NRCP

ANNEX A: Massive R&D Training Implementation Plan

AA1. Budget - General and LIB

*training proponent to provide justification for:

- proponent and staff compensation for Part 1 and Part 2
- preparation, printing and packaging of training and communications materials
- lab space facilities and equipment rental fee
- consumables
- electrical and water consumption
- travel/transportation
- contingency

*indicate counterpart institutional support

*training proponent indicates minimum and maximum number of trainees, with guidelines on minimum number of trainees provided by NRCP

*training proponent indicates the number of trainings it can conduct in one year

AA2. Cost Estimate, Co-funding by CHED and Schedule of Training Projects

*each training stint would be conducted for a maximum of one month, includes online and in-person components

*each training stint would have a maximum of 30 trainees

*each trainee would receive a Fellowship Grant of P70,000 for online and in-person parts; for travel and one-month living allowance

*estimated cost of 30 trainees at ~P70,000 per trainee is ~P2.1M

*estimated cost of hosting of training including staff compensation, materials, consumables, travel, rental, etc. is on average ~P1.9M (computational training - ~P1.5M, experimental/field/creatives training - ~P2.5M, policy, literary, communications training - ~P1.5M)

*estimated average cost of a training course is P4M; P100M can support 25 training courses a year

*costs could be shared with CHED, especially if CHED requests for more than 25 training courses per year

AA3. Teachers' and Trainers' Qualifications and Logistical/Financial Support

*teacher applicant as project leader must be a Regular Member of the NRCP

*well-published in peer-reviewed journals (at least 5 pubs)

*recognized expert in the R&D field of the submitted training proposal

*leads a research group in home institution, with staff and collaborators, to conduct training; i.e., group may consist of other faculty to team-teach the course

*provides certification of support from the home institution, of protected time of researcher, participation of staff and use of equipment and facilities to undertake training project

*team prepares teaching materials, perform evaluation based on established rating/grading criteria and scoring system, provide joint NRCP-Research group certification of proficiencies, competencies and skills gained during the training

*compensation of training team (rates standardized by NRCP) and cost of training materials, consumables, use of equipment and facilities must be justified

AA4. Trainees' Qualifications, Regional Distribution, Financial Support, Training Leave from Institution, Course Feedback

*trainee could be named NRCP R&D Training Fellow, i.e., becomes prestigious, considered a NRCP fellowship

*trainee would be an NRCP Associate or Regular Member, or faculty or researcher on tenure track in a SUC, HEI, government or PPP research institution

*trainee with a Master's degree or enrolled in a Master's program in the scope/subject of the training course is given priority

*aim for equitable distribution of trainees from the various regions of the country; home institution must provide endorsement of training and assure institutional supportafter the training

*each trainee is provided the same training materials, same NRCP standardized per diem/financial support during the online Part 1 phase; each trainee must have internet facility and zoom access

*each trainee provides an estimate of round trip travel expense from home institution to the training institution; NRCP provides standardized cost of living allowance (per diem) for Part 2 in-person training stint

AA5. Oversight Evaluation and Monitoring Team (OEMT) of Proposal Applications of Teachers/Trainers and Applications of Trainees, Monitoring of Progress and Completion of Training

* OEMT members are selected based on area of expertise and no COI (Conflict of Interest); selected from among regular NRCP members and non NRCP members such as NAST members

*OEMT members are provided compensation; standard or indicative rates provided by NRCP

*OEMT report template to be prepared

AA6. Additional Inclusion and Exclusion Limits

*foreign-based, non-NRCP expert teacher trainers are allowed as part of the training team, but not as project leader/principal teacher

*project leaders of NRCP-funded research projects are strongly encouraged to teach, train, mentor making use of NRCP-acquired equipment, facilities, consumables, staff

AA7. Trainee's Information

*qualifications, work experience

*endorsement of institution, status of employment

*goals for training, responsibilities in institution

*estimated cost of travel, accommodations, living expenses

AA8. Checklist of Required Documents, Templates of Required Documents

*for efficient processing of applications, NRCP provides a cover checklist

*NRCP prepares templates for each required document, to guide trainers and trainees to provide information systematically; this would greatly facilitate evaluation of applications

*NRCP templates could provide tick boxes of a list of categories/choices, while providing option for "Others," as described