

Challenges to Science Development and International Publishing in Indonesia

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ABSTRACT

The challenges facing the Indonesian scientific research community are likely to be equal or similar to those being faced by many if not most scientists in developing countries. The structural basis for research and publishing in Indonesia provides some valuable clues as to why the challenges are so large and why, despite the will-power to change or to succeed, such efforts might not lead to positive results. In addition to motivational issues at personal and institutional levels, objectives imposed by the Ministry of Education or by the Indonesian Institute of Sciences (IIS) tend to strongly influence the direction and eventual outcome of research objectives and also influence scientific output in terms of scientific publications in English or Bahasa Indonesia. Strongly implemented rules regarding research and publishing ethics can conflict strongly with ethical guidelines established for authors in international journals or by international publishers. This paper highlights all these issues within the Indonesian socio-cultural context. Only when we are able to understand the frame-work (social and policy) within which scientists are conducting research in Indonesia and in which they are publishing can advice be given and improvements be made.

Keywords: IAARD, IIS, IPB, open access, predatory, SPARD

Abbreviations: BAU, Bogor Agricultural University; DGHE, Directorate General of High Education; IAARD, Indonesian Agency for Agriculture Research and Development; ICISFRI, Indonesian Citrus and Subtropical Fruits Research Institute; IIS, Indonesian Institute of Sciences; IOCRI, Indonesian Ornamental Crop Research Institute; IPB, Institute of Plant Biotechnology; ME, Ministry of Education; OA, open access; SPARD, Strategic Plans of Agriculture Research and Development

INTRODUCTION

Indonesia is a richly diverse country with a multicultural society, and is the fourth most populous country in the world; it also listed as the world's 15th/16th strongest economy (Wikipedia 1), although its rank in science is much, much lower, at 64 (based on 1996-2010 data) (SJR 2012), and one of the world's poorest science performers (www.realonlinedegrees.com), leading thus to the Indonesian Government wanting to cover this gap between these statistics as quickly and efficiently as possible. Based on the Strategic Plans of Agriculture Research and Development (SPARD) 2010-2014 it is clearly stated that the Indonesian Agency for Agriculture Research and Development (IAARD) and all research commodity institutes under the IAARD have a vision to be world class research institutes (SPARD 2010). Until now, the IAARD was established and published 300 innovative technologies such as new superior varieties, seed production, agronomy, pest-disease control, post harvest, agro-ecological zone map, integrated-plant calendar, etc. that were ready to be used in commercial scales for improving income and welfare of agriculture business stakeholders (Three-Hundred (300) Innovative Technologies of Agriculture Research and Development, 2012). However, based on www.scimagojr.com, International publications from Indonesian scientists until 2010 was only ± 2000 papers and lower than Malaysia (> 14,000 papers), Singapore (± 14,000 papers) and Thailand (± 9000 papers) (Fig. 1). This is a pity because so many research activities have been carried out by all commodity research institutes under IAARD, the Indonesian Institute of Sciences (IIS), and universities; however, the number of international publications is imbalance with respect to research activities. Another important fact is that, until 2012, Indo-

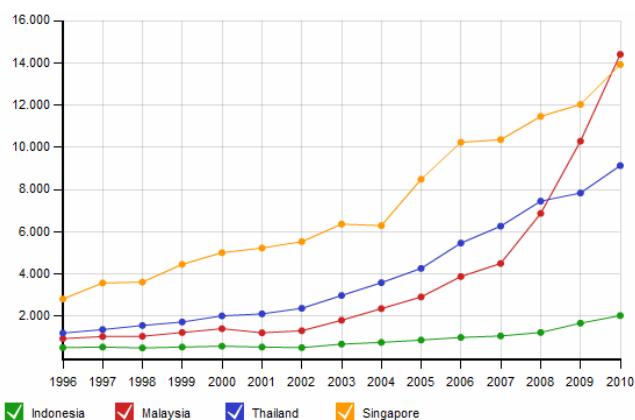


Fig. 1 Status of Indonesian International Publications compared to Malaysia, Thailand and Singapore. Source: www.scimagojr.com (©SCImago Research Group).

nesia only had 9 international journals (Table 1) (Kopertis 2012). Of interest, Indonesia is the world's largest palm oil, cinnamon and clove, it has the largest area of permanent crops, the largest Muslim population and the best men's badminton team (Wikipedia 2). It has a high corruption score and a modest democracy rank (Worldaudit.org 2012). As you traverse the country, from city to country side, it is not hard to see the massive challenges facing this country in terms of structural improvement, social development or achieving scientific excellence worthy of international recognition and appraisal. Often the personal desire for success, based strongly on a religio-cultural influence and desire and quest to be a better person, can meet a dead-end

Table 1 List of Indonesian international journals based on qualified editorial board, reviewers, varied-international authors and scientific content. The ranking does not represent a “best” to worst rank, but is based on a time scale required for the journal to be accepted internationally.

No	Name of Journal	ISSN	Publisher	Web-site
1.	ITB Journal of Engineering Science	19783051	Institut Teknologi Bandung (ITB), Bandung	http://journal.itb.ac.id/
2.	ITB Journal of Science	19783043	Institute for Research and Community Services; Institut Teknologi Bandung (ITB), Bandung	http://journal.itb.ac.id/
3.	Indonesian Journal of Geography	00249521	Gadjah Mada University, Yogyakarta	http://i-lib.ugm.ac.id
4.	Bulletin of Chemical Reaction Engineering and Catalysis	19782993	Diponegoro University, Semarang	http://bcrec.undip.ac.id
5.	Acta Medical Indonesia	01259326	Indonesian Society of Internal Medicine	http://www.inaactamedica.org/
6.	Critical Care and Shock	14107767	Indonesian Society of Critical Care Medicine	http://www.criticalcareshock.org
7.	Indonesian Quarterly	03042170	Centre for Strategic and International Studies	http://www.csis.or.id
8.	Nutrition Bulletin	02169363	Persatuan Ahli Gizi Indonesia	http://www.getcited.org
9.	Jurnal IJEEI (International Journal of Electrical Engineering and Informatics)	20856830	Institut Teknologi Bandung (ITB), Bandung	http://journal.itb.ac.id/

Source: www.kopertis12.or.id

simply because the ideological infrastructure simply does not exist, is rudimentary, or is insufficient to meet the requirements of the international community. Indeed, as for every country, this is a population struggling to deal with its own internal issues while also trying to satisfy an international audience and expectations. These expectations are not small.

This paper will outline the most important and current structural and institutional structures that are in place to serve the Indonesian scientific community. It will also highlight discrepancies between what is written or understood, and what is performed in practice. The challenges that researchers face in an environment of limited research budgets and often skeletal research facilities and within a system that imposes requirements that need to be met transnationally, adds pressure and could potentially lead to fraudulent situations that remain unchecked.

WHAT DOES SCIENCE MEAN TO SOCIETY AND WHAT DOES SOCIETY MEAN TO SCIENTISTS IN INDONESIA?

You do not have to look too deeply or travel too far to understand how complex this society is. Whether we are talking about clogged up highways that back up for miles into or out of Jakarta, or traffic that has been stopped for hours to allow free movement one way at the expense of movement of traffic in the opposite direction, the traffic chaos and driving tendencies tend to serve as a good barometer for how smoothly a society functions. A three-hour delay on a highway can easily see a meeting set for today be pushed forward to tomorrow. Sudden flash floods and torrential rain can prevent the physical movement to work. Insufficient infrastructure for piping, sewage or waste disposal and removal all affect the ecology and visual landscape. Unreliable or slow internet or wifi can cripple the limited and timely response. And casual, relaxing (almost procrastinative) habits such as arriving late to meetings, starting late or extending lunch for too long are all very real and practical issues that can strongly influence overall societal productivity, and as a sub-set, scientific productivity.

The Indonesian society often perceives science positively, but within a restricted sense. It sees science as a way to improve society and this is extremely evident in agriculture and agronomy, which accounts for 16.5% of the Indonesian economy (GDP) while occupying 38.3% of the total work force (Wikipedia 1). Society only tends to perceive science (more broadly) as being good or useful if it can lead to an improvement or enhancement of their life-style, although they seem to be totally oblivious of the fact that almost everything they use or consume on a daily basis is in fact dependent on and based on science. Other positive aspects of science in society highlighted by Indonesian researchers include the use of new technologies to help improve food security and farm management, and a high level of satisfaction by this sector of the work force, despite

the low salaries. Apart from these two main aspects, there does not seem to be a wider and stronger support basis for science by society, limiting the bridge between the two, often hindered by the fact that even though science is good, research facilities are poor. The most likely explanation may be because society cannot see any tangible benefits from science, even though they are totally enveloped by its off-products. In general terms, research is perceived in a negative light, probably because there is low understanding and appreciation for what is being done. Here, again, the exception seems to be in agriculture, where it is common to find extension services and community-based services that often involve courses that integrate members of society such as local farmers or high school students, offering a betterment of practical and useful knowledge which they then apply to the field or to higher education, respectively. Some of the negative image that society relates to science is, understandably, also related to money. There is a general sentiment that appreciation for science costs money (once again, almost oblivious that almost everything that constitutes the “quality of life” is dependent on and derived from science), and that to make money within society, science is not a pre-requisite. Indeed, an almost universal conflict is the notion that why should tax money be spent to further the knowledge of others. Some of the other negative perceptions of science by Indonesian society, assessed through a survey, include a low appreciation for science and/or scientists, poor funding, resources, or money and low incentives to succeed. Finally, there is a strongly negative image, although totally and irrationally linked to all branches of science, which associates science with extremely polar and negative issues, such as weapons and war, or misunderstood fields of study such as biotechnology, or even a challenge to religion and tradition. Increasingly, national research institutes and universities are having to seek ways to be self-sufficient and seek funding to support research projects, but the “commercialization” of science poses new risks and challenges, since if the impulse to follow only those sciences that yield profits, then pure sciences that lead only to intellectual understanding of issues will undoubtedly suffer negative consequences.

As a small microcosm of the Indonesian scientific landscape, and in a bid to deepen collaboration and to further create awareness of the real issues underlying science publishing within Indonesia, profoundly deep and sincere discussions and debates, occasionally heated, were held in three Indonesian institutes in September, 2012: Institute of Plant Biotechnology (IPB) of Bogor Agricultural University (BAU) in Bogor, Indonesian Ornamental Crop Research Institute (IOCRI) in Cianjur, and the Indonesian Citrus and Subtropical Fruits Research Institute (ICISFRI) in Malang. The approximately 60 individuals (official participants) who joined these self-improvement programmes were primarily concerned about how to improve and increase their profiles on the international arena, primarily through the medium of scientific publishing. Most were seasoned scientists, occasionally scientific officers or administration, and

Table 2 Self-perception* of the ethics of collaborative publishing (CP): total (absolute) number of respondents

	IPB-BAU (Bogor)	IOCRI (Cianjur)	ICISFRI (Malang)
Group 1 Rich + CP ethical	3	0	0
Group 2 Poor + CP ethical	0	0	0
Group 3 Rich + CP ethical	0	0	0
Group 4 Poor + CP ethical	18	17	19

Poor = insufficient funding to complete research requirements (does not reflect personal wealth)

Rich = sufficient funding to complete research requirements (does not reflect personal wealth)

* Respondents were requested to indicate into which group they fell into with respect to research and publishing ethics involving CP.

ranging in age from approximately 20-65 years of age. However, they brought with them the wider concerns of their colleagues. They represented, to some extent, the voice of the scientific bodies within each of their institutes, and, through deeper discussion of national issues and framework challenges, they more broadly represented the voice of the Indonesian scientist. This paper also reflects their frank and straight-forward opinions, concerns and challenges.

It is actually quite fascinating speaking to Indonesian scientists from these three research institutes, because the common thread that can be perceived is that the main reason for having become a scientist is the passion for a personal reason. The personal reasons can be as diverse as a simple love for flowers, the desire to assist a father who was also involved in agriculture (such as rice farming), the genuine desire to help society, or a pure quest for knowledge. Some lived in villages and thus selected the agriculture faculty to study simply because of the proximity to home or to the family's agricultural background. Others yet simply wanted a job as a government officer because of the relative ease with which they could obtain such a job and the long-term security it could provide. These are stories of personal *chautauquas*, often quasi-altruistic in that through science, there is a perspective that would allow them to further their own objectives (occasionally perceived as being selfish) while also giving back to society in practical ways, for example improving agricultural production for society. Although it was difficult to quantify, the sense that one has is that there are two broad streams of scientific researchers: those who seem to downplay the importance of money but who struggle to secure higher salaries or better research funding, and those who have been able to reach a stratum of the scientific community or ministerial/policy-making level where the salary is good and the research funding is abundant (e.g. the three respondents in Bogor, **Table 2**). For example, on average, a highly qualified researcher in a national research institute would receive about 20 million Rupiah whereas a high school teacher might receive double that (averages), showing the almost lack of appreciation for highly skilled researchers. There is also a distinct and acute disparity between higher institutes in more urban areas and rural research centers, which have more recently been required to perform at the same level through nation-wide ME-implemented or IIS-supported regulations, despite massive inequalities in structural facilities (laboratory structure, equipment and chemicals) which would seriously undermine the ability of the latter group of scientists to compete against scientists from urban research centers, which tend to be better established, with stronger infrastructure and thus a greater ability to outperform their rural colleagues both nationally and internationally. To further complicate the issue, researchers are torn between the need to publish in good international journals to serve an international scientific community and to show their publishing prowess, and the need to publish "lower" level papers in local, Indonesian journals, most often in Bahasa Indonesia, to serve the society's needs. This relevance to society extends even further, with a need for

their ideas to reach policy-makers. Such publications are required to obtain research funding and to secure job positions. These dual strata underlying society and science in Indonesia will be a recurring theme throughout this paper, and will, in our opinion be a serious caveat to improving the system and finding a nation-wide solution to the internationalization of Indonesian science.

The workshop participants indicated, as the primary reasons (or important characteristics) for pursuing research and wanting to do scientific work, the following:

- ✓ Significant sense, interesting, up-to-date;
- ✓ Good methodology, informative and useful;
- ✓ The value of the contribution;
- ✓ Novelty and a breakthrough to society and industry;
- ✓ Reproducibility (nationally and internationally);
- ✓ Dealing with "hot issues";
- ✓ Honesty;
- ✓ English ability and language/scientific writing skills;
- ✓ Is the work government accredited, i.e., by the Ministry of Education (ME) and/or IIS, listed on Scopus (Elsevier), or with an Impact Factor[®] (IF[®]).

WHAT CONSTITUTES AUTHORSHIP FOR INDONESIAN SCIENTISTS AND HOW DOES COLLABORATIVE PUBLISHING FIT INTO THE PICTURE?

For 97% of the workshop respondents, an author was clearly defined as a person that had made a significant contribution to the conception, design, execution, or interpretation of the reported study. Whether the target was a national or an international journal, the pre-requisite for authorship did not change. Moreover, it was abundantly clear that any author that appeared on a scientific paper was most likely only responsible for a single responsibility (not all four), and that it was very rare to find only one person who had the responsibility towards all four functions. Someone who assisted in the interpretation of the study, at the stage of the manuscript writing, and who assisted with the linguistic and scientific interpretation and improvement of the study, i.e., a publishing collaborator (Teixeira da Silva 2011), was considered by 100% of all participants to be a legitimate co-author, and in most cases, a vital member of the team (**Table 2**). Despite this, only few had resorted to such a method, mainly due to pride-related issues (i.e., not wanting to ask for assistance from a total stranger). This lack of publishing collaboration was extremely evident in the lack of performance in international publishing, and among the two national research institutes (IOCRI and ICISFRI), except for publishing collaboration with Dr. Winarto at IOCRI, only a handful of papers had been published in international journals of repute in the past two decades. The situation at IPB-BAU was very different since several international research collaborations exist (i.e., between laboratories of different countries), which allowed them to automatically establish international publishing collaboration and thus with a higher track record of international publications (**Table 3**). Based on <http://manajemen.fem.ipb.ac.id> (2013), international publications from IPB tended increase from year to year (**Fig. 2**), however, when compared to other universities, the number of international publications from IPB was lower than Bandung Technology Institute (ITB), University of Indonesia (UI) and Gadjag Mada University (UGM) (**Fig. 3**). All lecturers who successfully published papers internationally received a financial publishing incentive of about 5-10 million rupiah per paper. In Indonesia, a financial publishing incentive can be claimed for all scientific papers published internationally if they were published in a non-open access (OA) journal.

In contrast, IAARD researchers could only publish in international journals with no IF or, to a high extent, in predatory journals of publishers with suspect academic reputation and performance (**Table 4**). IAARD researchers received a financial publishing incentive of about 1.25-2.5

Table 3 International publications from IPB lecturers in 2011 (and some 2012). * = co-author. Journals highlighted in grey are considered to be of “predatory publishers” as defined by Jeffrey Beall at www.scholarlyyoa.com

Lecturer's name	Paper title	Journal
Dr. Aris Tri Wahyudi, MSi	Soybean Response to 1-Aminocyclopropane-1-Carboxylate Deaminase-Producing <i>Pseudomonas</i> under Field Soil Conditions	American Journal of Agricultural and Biological Science 6(2): 273-278, 2011
Dr. Ir. Asep Saefudin, MSc	On Comparison between Ordinary Linear Regression and Geographically Weighted Regression: With Application to Indonesia Poverty Data	European Journal of Scientific Research 57(2): 275-285, 2011
Dr. Ir. Asep Saefudin, MSc	The Effect of Over dispersion on Regression Based Decision with Application to Churn Analysis on Indonesian Mobile Phone Industry	European Journal of Scientific Research 60(4): 602-610, 2011
drh. Okti Nadia Poetri, Msi, MSc	A Single Vaccination of Commercial Broilers does not Reduce Transmission of H5N1 Highly Pathogenic Avian Influenza	Veterinary Research 42: 74, 2011
drh. Okti Nadia Poetri, Msi, MSc	A Lack of Antibody Formation Against Inactivated Influenza Virus After Aerosol Vaccination in Presence or Absence of adjuvantia	Veterinary Immunology and Immunology 143: 147, 2011
Dr. Ir Damayanti, MSc	Combining High Biodiversity with High Yields in Tropical Agroforests	PNAS, 108(20): 8311-8316, 2011
Dr. Ir. Siswadi, MSc	Goodness-of-Fit of Bioplots via Procrustes Analysis	Far East Journal of Mathematical Sciences 52(2): 191-201, 2011
Dr. Ir. Rd. Roro Dyah Perwitasari, MSc	Sex-Biased Dispersal and Volcanic Activities Shaped Phylogeographic Pattern of Extant Orangutans (genus: <i>Pongo</i>)	Biology Molecular and Evolution 28(8): 2275-2288, 2011
Ardiansyah, STO., Msi, PhD	Regulation of Blood Pressure and Glucose Metabolism Induced by L-Tryptophan in Stroke-prone Spontaneously Hypertensive Rats	Nutrition and Metabolism 8(45): 1-7, 2011
Dr. Ir Yulin Lestari	<i>Actinophytocola timorensis</i> sp.nov and <i>Actinophytocola corallina</i> sp.nov., Isolated from Soil	International Journal Systematic and Evolutionary Microbiology 61: 834-838, 2011
Dr. Nancy Dewi Yuliana, STP., MSc	Comprehensive Extraction Method Integrated with NMR Metabolomics: A New Bioactivity Screening Method for Plants, Adenosine A1 Receptor Binding Compounds in Orthosiphon Stamineus Benth	Analytical Chemistry 83: 6902-6906, 2011
Dr. Nancy Dewi Yuliana, STP., MSc	Screening of Selected Asian Spices for Anti Obesity-Related Bioactivities	Food Chemistry 126: 1724-1729, 2011
Dr. Nancy Dewi Yuliana, STP., MSc	Comprehensive Review on Herbal Medicine for Energy Intake Suppression	Obesity Reviews 12: 499-514, 2011
Dr. Nancy Dewi Yuliana, STP., MSc	Metabolomics for Bioactivity Assessment of Natural Products	Phytotherapy Research 25: 157-169, 2011
Dr. drh. Hera Mahadewi, MSc	Determination of Estrous Period in Female Rats (<i>Rattus novvergicus</i>) by Fourier Transform Infrared (FTIR) Spectroscopy Through Identification of Reproductive Hormone in Blood Samples	World Applied Sciences Journal 14(4): 539-545, 2011
Dr. Ir. Ence Darmo Jaya Supena, MS	Refinement of Shed-Microspore Culture Protocol to Increase Normal Embryos Production in Hot Pepper (<i>Capsicum annuum</i> L.)	Scientia Horticulturae 130: 769-774, 2011
Dr. Ir. Ence Darmo Jaya Supena, MS	Identification of Silverleaf Whitefly Resistance in Pepper	Plant Breeding, 2011
Dr. Ir. Arief Hartono, M.Agric.Sc	Fluxes of Dissolved Organic Carbon in Three Tropical Secondary Forest Developed on Serpentine and Mudstone	Geoderma 163: 119-126, 2011
Dr. Sugeng Heri Suseno, SPi, MSi	Improving the Quality of Lemuru (<i>Sardinella lemuru</i>) Oil Using Magnesol XL Filter Aid	International Food Research Journal 18: 255-264
Prof. Dr. Ir. C. Hanny Widjaja*, MSc	Relationship between Sensory Attributes of Bakasang (a Traditional Indonesian Fermented Fish Product) and its Physicochemical Properties	Fisheries Science 78(1): 187-195, 2012
Prof. Dr. Ir. Maggy Thenawidjaja*	Fermentation RS3 Derived from Sago and Rice Starch with <i>Clostridium butyricum</i> BCC B2571 or <i>Eubacterium rectale</i> DSM 17629	Anaerobe 18(1): 55-61, 2012
Dr. Kustiariyah, SP, MSi	Helicascolide C, a New Lactone from an Indonesian Marine Algicolous Strain of <i>Daldinia eschcolzii</i> (Xylariaceae Ascomycota)	Phytochemistry Letters 286: 1-4, 2011
Dr. Ir. I Wayan Darmawan, MSc.F.Trop	Performance of Helical Edge Milling Cutters in Planing Wood	Journal of Wood and Wood Products 69: 565-572, 2011
Dr. Ono Suparno, STP., MT.	An Innovative New Application of Oxidizing Agents to Accelerate Chamois Leather Tanning, Part I: The Effects of Oxidizing Agents on Chamois Leather Quality	Journal of the American Leather Chemists Association 106(12): 353-392, 2011
Dr. Aris Tri Wahyudi, MSi	Growth Enhancement and Disease Reduction of Soybean by 1-aminocyclopropane-1-carboxylate deaminase-producing <i>Pseudomonas</i>	American Journal of Applied Sciences 8(11): 1073-1080, 2011
Dr. Ir. I. Wayan Mangku, M.App.Sc.	Estimating the Intensity Obtained as the Product of A Period Function with the Linear Trend of A Non-Homogeneous Poisson Process	Far East Journal of Mathematical Sciences 51(2): 141-150, 2011
Dr. Ir. Bisman Nababan, MSc	Chlorophyll Variability in the Northeastern Gulf of Mexico	International Journal of Remote Sensing 32(230): 8373-8391, 2011
Drh. I Ketut Mudite Adnyane, Msi, PAVet	Morphological Study of the Lingual Papillae in the Barking Deer, <i>Muntiacus muntjak</i>	Anatomia, Histologia, Embryologia 40: 73-77, 2011
Dr. Ir. Rd. Roro Dyah Perwitaasari, MSc	Gene Conversion and Purifying Selection Shape Nucleotide Variation in Gibbon L/M Opsin Genes	BMC Evolutionary Biology 11: 312, 2011
Dr. Ir. Sutrisno, M.Agr.	Development of Packaging Design for Export Destination of Mangosteen Fruits (<i>Garcinia mangostana</i> L)	European Journal of Scientific Research 62(3): 344-353, 2011
Prof. Dr. Ir. Kudang Boro Seminar, MSc	Supervisory Control System Parameter Temperature and Humidity in Closed House Model for Broilers	International Journal of Engineering and Sciences 11(6): 1-8, 2011
Dr. Dra. Sri Sudarmiyati, MSc	Conservation Value of Cacao Agroforestry Systems for Terrestrial Harbaceous Species in Central Sulawesi, Indonesia	Biotropica 43(6): 755-762, 2011

million rupiah per paper although this incentive was provided with no strict consideration about the journal status (i.e., high/low/no IF; OA vs non-OA; predatory, or not). Unfortunately, this incentivizes researchers to publish

papers in “International” OA journals with no publication fee. Many such journals are termed predatory journals, and are currently a concern for the academic community since no quality control, peer review or scholarly standards are

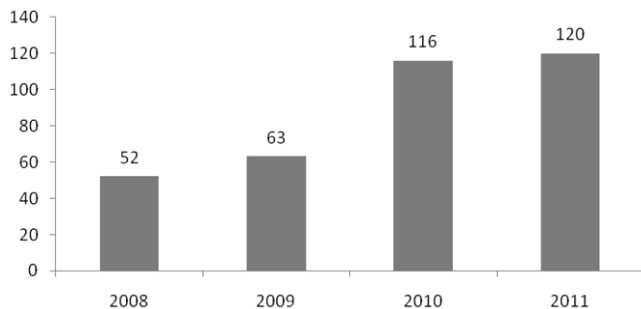


Fig. 2 Number of International Publications from Bogor Agriculture University from 2008-2011. Source: <http://manajemen.fem.ipb.ac.id>, 2013.

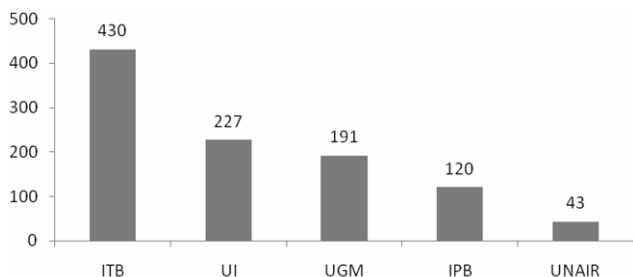


Fig. 3 Comparison in number of international Scopus-indexed publications from five Universities in Indonesia in 2011. ITB – Bandung Technology Institute, UI – University of Indonesia, UGM – Gadjah Mada University, IPB – Bogor Agriculture Institute, UNAIR – University of Airlangga, Surabaya (<http://manajemen.fem.ipb.ac.id>, 2013)

being practiced (see a consequence in **Appendix 1**). This issue is dealt with separately elsewhere.

WHAT IS THE PERCEPTION OF OPEN ACCESS PUBLISHING?

Although most of the workshop participants knew about or had even published in OA journals, very few of them were aware of the risks, and none of them knew about predatory publishing, with a focus on OA. In initial debates regarding the positive and negative impacts of OA, very conventional opinions emerged (**Table 5**), but which did not show a deeper understanding of the issues related to copyright versus creative commons, or predatory publishing. Some of the risks and pit-falls were examined through examination of web-sites such as www.scholarlyoa.com and two case studies (**Appendix 1**). Extremely poor English, which would dilute the message, and reduce the confidence in the experimental data provided, at least to an international audience, coupled with publication in a predatory publisher's journal (for example, Sukristiyonubowo *et al.* 2012; International Research Journal of Agricultural Science and Soil Science; Interesjournals) reduce the impact and credibility of Indonesian scientists.

Based on the accreditation guidelines for scientific publications both from the Directorate General of High Education (DGHE) and IIS, it is clearly regulated that all scientific publications are accredited based on several parameters, namely: (1) journal name, (2) journal organization, (3) editorial boards, (4) journal performance, (5) writing style, (6) journal substance, (7) journal continuity, (8) post-publication responsibility (Accreditation Guideline of Scientific Publications 2006a, 2006b). In 2012, in Indonesia, there were 7.000 scientific publications published by research institutes, universities, professional organizations, etc., and 4.000 journals were able to maintain publication continuity (Indonesian Scientific Database 2012). Furthermore, 250 of these journals were accredited by the DGHE while 300 journals were accredited by IIS (<http://www.dikti.go.id>, 2012; <http://www.pdii.lipi.go.id>, 2012). The accreditation

life period was 5 years for each journal and re-accreditation will be carried out continually to evaluate the visibility of each journal using all 8 factors listed above. If an accredited journal can continually obtain a high score for all 8 accreditation requirements, then the journal will retain its accredited status, or, if it fails in just one requirement, the journal will lose its accreditation status, as occurred in 2012 (**Table 6**).

According to the DGHE, although a lot of scientific journals are published in Indonesia, far too few are successfully published and indexed internationally and only 0.7% (Table 1 in <http://www.antaraneews.com>, 2012). Based on the DGHE and IIS scientific publication guideline, several problems faced by Indonesian journals until 2006 were summarized: the simultaneous availability of “qualified” manuscripts, reviewing process, journal marketing and distributing. Another serious problem was the lower capacity to prepare and write a qualified manuscript for scientific publication (Scientific Accreditation Guideline 2006a, 2006b). From other local publications it was reported that critical problems hindering Indonesian Journals from becoming qualified international journals were: (1) lack of improvement of publication quality, (2) lack of supporting budget for international publication, (3) low commitment to maintaining high quality performance, (4) difficulties in finding international collaborators for editorial boards and reviewers, (5) language problem (English papers), (6) weaknesses in preparing, writing and publishing qualified manuscripts, (7) insufficiency in qualified manuscripts, (8) publication period and fee (<http://koran.kompas.com>, 2009a, 2009b and 2009c; <http://indonesiabuku.com>, 2009; <http://public.kompasiana.com>, 2009; <http://www.wonogiripos.com>, 2012). Several of these existing problems lead to some accredited DGHE or IIS journals to be black-listed/.

WHAT IS THE STRUCTURE OF THE INDONESIAN MINISTRY OF EDUCATION THAT OVERSEES SCIENCE?

To better understand how science will progress in the future in Indonesia and how it will plan to address national and local challenges and meet the level of science needed to be upheld in international standards, it is important to first understand some key aspects of the ME and of current (February 2013) rules and regulations that are in place governing issues in science research and science publishing.

In Indonesia, there are two important institutes which have responsibility to value researchers with regards to their position, growth/improvement and maintenance of their level. All researchers under education institutes such as IPB, Indonesian University, Bandung Institute Technology, Gadjah Mada University, as well as scientific professional associations such as the Indonesian Horticulture Association (PERHORTI), Indonesian Breeding Association, Indonesian Soil Association, etc. all fall under the responsibility of the DGHE of the ME and all researchers under research institutions under Indonesian cabinet ministries such as Agriculture, Forestry, and Fishery Ministry. In addition, Indonesian research agencies such as the National Atomic Agency, National Archeology Agency, Agency for Technology Assessment and Application, etc. are all managed by IIS. Both DGHE and IIS are actually at the same level and with the same decision-making power regarding the accreditation of journals and researchers. Both institutions (DGHE and IIS) also have committees/teams who have responsibility for accrediting the status of journals in Indonesia based on different criteria: DGHE for all journals published by education institutes and scientific professional associations and IIS for all journals published by research institutes. Due to the different criteria applied for both institutes, there are different perceptions in evaluating the quality of a journal. For example, on occasion, a journal accredited with an A level by DGHE may have received a B level accreditation by IIS.

The IIS has implemented a point or credit system as well as a level system for all Indonesian scientists based on Decision Letter of Country Administration Ministry, No: 128/MENPAN/9/2004 (under The IAARD and all institutes under IIS credit management), as follows:

Group 1: First researcher. Requires 0-200 points for 5 years (4 + 1).

Group 2: Young researcher. Requires 201-400 points for 5 years (4 + 1).

Group 3: Medium researcher. Requires 401-850 points for 5 years (4 + 1).

Group 4: Main/Top researcher. Requires 851-1050 points for 5 years (4 + 1).

(4 + 1) means that every level has to be reached within 4 years. If someone fails to fulfill total credits within a suitable level, then that person still has 1 additional year to complete it. If, after this person still fails to achieve this goal, they will lose their functional position (i.e., demoted) and become general staff with a lower salary. A researcher who

obtains a Bachelor (S-1) receives 100 points, an MSc (S-2) 150 points and a PhD (S-3) automatically receives 200 points. To reach each level of research status, every researcher has to collect points as stated above. The points come mainly from an education certificate based on the education level, 100 points for S-1, 150 points for S-2 and 150 points for S-3 and scientific publications both nationally and internationally. Minor credit points can also come from training certificate, guiding and directing junior researchers and students, seminar certificates, involvement in professional organizations, etc. There are no differences in the credit system, regardless of the source of education (i.e., a PhD from a local Indonesian university would have the exact same weighting as University of California – Davis, for example), which could be a demotivating factor. Thus, MSc or PhD graduates from local or international universities would receive the same points and salary, although, most certainly, they would have different tasks and responsibilities. The level of appreciation (between local vs inter-

Table 4 International Publications from researchers of Indonesian Agency for Agricultural research and Development. Journals highlighted in grey are considered to be of “predatory publishers” as defined by Jeffrey Beall at www.scholarlyoa.com

Author/s	Institution	Article title	Journal
2010/2011			
Budi Winarto, Nurhayati A Matjik, Agus Purwito, Budi Marwoto, Jaime A. Teixeira da Silva	Indonesian Center for Horticulture Research and Development	Ploidy Screening of Anthurium (<i>Anthurium andreanum</i> Linden ex André) Regenerants Derived from Anther Culture	Scientia Horticulturae 127: 86-90, 2010
Ellina Mansyah	Indonesian Tropical Fruit Research Institute	Assessment of Inter Simple Sequence Repeat (ISSR) Technique in Mangosteen (<i>Garcinia mangostana</i> L.) Grown in Different Sumatra Region	Journal of Horticulture and Forestry 2(6): 127-134, 2010
Budi Winarto, Jaime A. Teixeira da Silva	Indonesian Center for Horticulture Research and Development	Microspore Culture Protocol on Indonesian <i>Brassica oleracea</i>	Plant Cell, Tissue and Organ Culture 107(2): 305-315, 2011
Budi Winarto, Fitri Rachmawati, Dewi Pramanik, Jaime A. Teixeira da Silva	Indonesian Center for Horticulture Research and Development	Morphological and Cytological Diversity of Regenerants Derived from Half-anther Cultures of <i>Anthurium</i>	Plant Cell, Tissue and Organ Culture 105(3): 375-382, 2011
Sukristiyonubowo	Indonesian Soil Research Institute	Nutrient Balances of Wetland Rice Fields for the Semarang District (Indonesia)	Journal of Sustainable Agriculture 34: 850-861, 2010
Budi Winarto, Fitri Rachmawati, Jaime A. Teixeira da Silva	Indonesian Center for Horticulture Research and Development	New Basal Media for Half-Anther Culture of <i>Anthurium andreanum</i> Linden ex Andre cv. Tropical	Journal of Plant Growth Regulation 65(3): 513-529, 2011
Sri Hadiati, Sri Yuliati, A. Soemargono	Indonesian Tropical Fruit Research Institute	Evaluation of Qualitative and Quantitative Characters of Pineapple Hybrids Resulted from Crossing Between Cayenne and Queen	ARPJ Journal of Agricultural and Biological Science 6(1): 32-38, 2011
Ni Luh Putu Indriyani, Sri Hadiati A. Soemargono	Indonesian Tropical Fruit Research Institute	The Effect of Planting Medium on the Growth of Pineapple Seedling	ARPJ Journal of Agricultural and Biological Science 6(2): 43-48, 2011
Masniari Poeloengan	Indonesian Center for Veterinary Research and Development	The Effect of Red Ginger (<i>Zingiber officinale</i> Roscoe) Extract on the Growth of Mastitis Causing Bacterial Isolates	African Journal of Microbiology Research 5(4): 382-389, 2011
Puji Lestari, Kurniawan Rudi Trijatmiko, Reflinur	Indonesian Center for Agricultural Biotechnology and Genetic Resources	Mapping Quantitative Trait Loci Conferring Blast Resistance in Upland <i>Indica</i> Rice (<i>Oryza sativa</i> L.)	Journal of Crop Science and Biotechnology 14(1): 17-24, 2011
Sukristiyonubowo	Indonesian Soil Research Institute	Change from Conventional to Organic Rice Farming System: Biophysical and Socioeconomic Reason	International Research Journal of Agricultural Science and Soil Science 1(5): 172-182, 2011
Sukristiyonubowo, Ibrahim Adamy Sipahutar, Tagus Vadari	Indonesian Soil Research Institute	Management of Inherent Soil Fertility of Newly Opened Wetland Rice Field for Sustainable Rice Farming in Indonesia	Journal of Plant Breeding and Crop Science 3(8), 146-153, 2011
Rizatus Shofiati	Indonesian Center for Agricultural Land Resources	Spatio Temporal Pattern Recognition of NDV 1 and TCT Wetness for Determining Cropping Type and Cropping Pattern of Paddy Fields	Asian Journal of Geoinformatics 11(3), 2011
Rizatus Shofiyati, Saefoel Bachri, Muchrizal Sarwani	Indonesian Soil Research Institute	Soil Database Management Software Development for Optimizing Land Resource Information Utilization to Support National Food Security	Journal of Geographic Information System 3: 211-216, 2011
Sukristiyonubowo	Indonesian Soil Research Institute	Plot Scale Nitrogen Balance of Newly Opened Wetland Rice at Bulungan District	International Research Journal of Agricultural Science and Soil Science 1(7), 234-241, 2011
Achmad Arivin Rivaie	Indonesian agency for Agricultural Research and Development	Growth Response of Broom (<i>Cytisus scoparius</i>) Growing With and With-out Radiata Pine (<i>Pinus radiata</i>) Seedlings to Different P Levels in Soils	Journal of Forestry Research 22(4): 597-602, 2011

Table 4 (cont.)

2011/2012			
Retno SHM, Sumardjo, Nuurmala K. Pandjaitan, Djuarsa P. Lubis	Indonesian Center for Agricultural Library and Technology Dissemination	Cyber Extension as a Communications Media for Vegetable Farmer Empowerment	Academic Journal Extension and Rural Development 4(3), 77-84, 2012
Puji Lestari, Suk Ha Lee	Indonesian Center for Agricultural Biotechnology and Genetic Resources	Vistra Green-Stained cDNA AFLP Technique for Identification of Transcript Profiles in Supernodulating Soybean	International Journal of Agricultural Sciences 1 (1), 429-434, 2011
Bambang Winarko	Indonesian Center for Agricultural Library and Technology Dissemination	Disseminating Agricultural Information Through the Internet: Indonesian Center for Agricultural Library and Technology Dissemination Experience	International Journal of Electronic Commerce Studies 2(2): 149-156, 2011
R. Indastri, A. Muharam, Y. Sastro, I.P. Lestari	Indonesian Center for Agricultural Technology Assessment	Study on Organic Fertilizers to Totally Substitute Chemical Fertilizers in Hydroponics of Tomatoes	Crop and Environment 2(2): 28-32, 2011
Sukristiyonubowo, Fadhli Y., A. Sofyan	Indonesian Soil Research Institute	Plot Scale Nitrogen Balance of Newly Opened Wetland Rice at Bulungan District	International Research Journal of Agricultural Science and Soil Science 1(7): 234-241, 2011
Y. Suryadi, D.N. Susilowati	Indonesian Center for Horticulture Research and Development	Antagonistic Activity of Indigenous Indonesian Bacteria as the Suppressing Agent of Rice Fungal Pathogen	Journal International Environmental Application and Science 6(4): 558-568, 2011
Y. Suryadi, M. A. Suhendar, A. Akhdiya, I. Manzila, Wawan	Indonesian Center for Horticulture Research and Development	Evaluation of Soybean Germplasm for its Resistance to Several Foliar Pathogens in Indonesia	Journal of Agricultural Technology 8(2): 761-773, 2011
Endang Yuli Purwani, Tresnawati Purwadaria, Maggy Thenawidjaja Suhartono	Indonesian Center for Post-Harvest	Fermentation RS3 Derived from Sago and Rice Starch with <i>Clostridium butyricum</i> BCC B2571 or <i>Eubacterium rectale</i> DSM 17629	Anaerobe 18(1): 55-61, 2012
Budi Winarto, Jaime A. Teixeira da Silva	Indonesian Center for Horticulture Research and Development	Improved Micropropagation Protocol for Leatherleaf Fern (<i>Rumohra adiantiformis</i>) using Rhizomes as Donor Explant	Scientia Horticulturae 140: 74-80, 2012
Budi Winarto, Jaime A. Teixeira da Silva	Indonesian Center for Horticulture Research and Development	Sterilization Procedures for <i>in Vitro</i> Culture of Leather Leaf Fern (<i>Rumohra adiantiformis</i>)	International Journal of Plant Developmental Biology 6(1): 46-50, 2012
Budi Winarto, Jaime A. Teixeira da Silva	Indonesian Center for Horticulture Research and Development	Isolation Technique and Initiation Culture Medium: Keys to Callus Induction and Formation in <i>Anthurium</i> Half-Anther Culture	Plant Cell, Tissue and Organ Culture 110(3): 401-411, 2012
Riska, Jumjunidang, Catur Hermanto	Indonesian Center for Agricultural Technology Assessment	Confirm the Status of VCG <i>Fusarium oxysporum</i> f. sp. <i>Cubense</i> in West Sumatera Indonesia	ARPN Journal of Agricultural and Biological Science 7(4): 244-249, 2012
Rizatus Shofiati, Ishak Hanafiah Ismullah, Hidayat Pawitan	Indonesian Center for Agricultural Land Resources	Multi Sensor Satellite Data for Rice Production Estimation in an Effort to Support National Food Security	Journal of Agriculture and Food Technology 1(12): 238-244, 2011
Sukristiyonubowo, Sofyan Ritung, Kusumo Nugroho	Indonesian Soil Research Institute	Nitrogen and Potassium Balances of Newly Opened Wetland Rice Field	International Research Journal of Agricultural Science and Soil Science 2(5): 207-216, 2012
Markus Anda, Muhrizal Sarwani	Indonesian Center for Agricultural Land Resources	Mineralogy, Chemical Composition, and Dissolution of Fresh Ash Eruption: New Potential Source of Nutrients	Soil Science Society of America Journal 76(2): 733-747, 2012

Table 5 Perceptions among Indonesian scientists regarding open access (OA) publishing.

OA is good	OA is bad
Information is free and easy to access	Information published is not valid
Results and research can be accelerated	Not popular
Information and references (literature) is free, so this allows for self-improvement at no cost	There are risks if the publisher and journal are not carefully selected
Even if free, many papers are of a very high level	Old experimental data can be published
Support is provided, e.g. by universities or government, to publish in OA	It is easy to falsify data and to create false/fraudulent papers
OA can lead to more citations and thus to higher IF [®]	Data protection is weak
It is easy to submit to OA journals	High risk of plagiarism and poor quality control
It is easy to publish in OA journals	
Peer review	

* The debate was divided into two teams, one defending one of the sides of the good/bad divide, independent of their own personal convictions.

national graduation) would occur if a researcher were to have or apply for a structural position such as Director, Dean, Vice, Chief, etc. of low-high Research or Education Institutes. Additional advantages of having an international degree would be the ability to publish scientific papers internationally or to have partners in international projects. In contrast, functional staff (researcher or lecturer) in a "normal" position would all almost invariably receive the same salary and work conditions. Due to this regulation,

every researcher has to take into serious consideration his/her level. If, after 4 + 1 years, he/she can not reach the required number of points, he/she will lose his/her research status as functional staff and he/she will be placed as structural staff that will retire at 56 years of age with a lower monthly salary due to the loss of functional salary. This would basically guarantee a secure job position until the age of 56, independent, to some degree, of the level of effort exerted (in terms of work productivity and publishing

Table 6 Indonesian journals that failed to re-obtain an accredited status (according to DGHE, IIS and LIPI).

Journal name	ISSN	Publisher	Website
TEOLOGIA, Jurnal Ilmu-ilmu Ushuludin	0853-3857	Fakultas Ushuludidin IAIN Walisongo, Semarang	-
SOSIO-RELIGIA	1412-2367	Lingkar Studi Ilmu Agama dan Ilmu Sosial	-
Millah, Jurnal Studi Agama	1412-0992	Magister Studi Islam, Universitas Islam Indonesia	www.msi-iii.net
Jurnal Manajemen Teknologi	1412-1700	Program Pascasarjana Magister Bisnis Administrasi dan Teknologi ITB, Program MBA ITB	www.mba.itb.ac.id
Jurnal Ekonomi Pembangunan	1411-6081	Balai Penelitian dan Pengembangan Ekonomi, Fak Ekonomi, Universitas Muhammadiyah Surakarta	http://click.to/ifeuma
Gadjah Mada Internasional Journal of Business	1411-1128	Program Magister Manajemen, Fak. Ekonomi dan Bisnis, UGM	www.ijb.mmugm.ac.id
Jurnal Keuangan dan Perbankan	1410-8623	Pusat Penelitian dan Pengabdian kepada Masyarakat, Program Magister Manajemen, IKPIA Perbanas	www.perbanasinstitute.ac.id/jurnal
Jurnal Hukum Internasional	1693-5594	Lembaga Peengkajian Hukum Internasional, Fak Hukum, Universitas Indonesia	-
DIDAKTIKA	1411-3384	FKIP, Universitas Mulawarman	-
Jurnal Pendidikan Dasar	411-285X	Universitas Pree, Universitas Negeri Surabaya	-
Jurnal Ilmu Pendidikan	0215-9643	LPTK dan ISPI	www.malang.ac.id
Jurnal Manajemen Pelayanan Kesehatan	1420-6515	Pusat Manajemen Pelayanan Kesehatan, Fakultas Keokteran, UGM, Yogyakarta	www.jmpk-online.net
Majalah Kedokteran Bandung	0216-074X	Fakultas Kedokteran, Universitas Padjajaran, Bandung	-
Acta Medica Indonesiana	0125-9326	Perhimpunan Dokter Spesialis Ilmu Penyakit Dalam Indonesia	-
Indonesian Journal of Biotechnology	0853-8654	Graduate School Gadjah Mada University, Yogyakarta	-
Jurnal Ilmu Kefarmasian Indonesia	1693-1831	Fakultas farmasi, Universitas pancasila, jakarta	-
Journal of Biological Researches	0852-6834	Perhimpunan Biologi Indonesia, cabang Jawa Timur	http://www.hayati.discoveryindonesia.ac.id
Indonesian Journal of Physics	0854-6878	Department of Physic Institute Technology Bandung	www.ijph.org

Table 7 Scientific Publication and its value score based on Revised-Regulation of Indonesian Institute of Science and Indonesian Agency for Personnel Administration; No: 412/D/2009 and No: 12/2009.

Code. No.	Form of Scientific Publication	Value Score
II.A.1	Scientific publication published internationally in book	40 in all levels
II.A.2	Scientific publication published nationally in book	30 in all levels
II.A.3	Scientific publication published internationally in part of book	20 in all levels
II.A.4	Scientific publication published nationally in part of book	15 in all levels
II.A.5	Scientific publication published in international journal	40 in all levels
II.A.6	Scientific publication published in national journal	25 in all levels
II.A.7	Scientific publication published in international proceeding	15 in all levels
II.A.8	Scientific publication published in national proceeding	10 in all levels

IIS Regulation No: 06/E/2009 about Technical Guideline of Research Functional Position

potential). For each research level, the role of the senior researcher in guiding, directing, educating and training is important.

Scientists within groups 1-4 can retire at 60 years of age while group 4 scientists with professor research status retire at 65 years of age, which represents a large range difference of approximately 7% (average of males and females) if we consider the average life expectancy of Indonesians (men = 68.7; women = 72.7; both = 70.7; ranked 110 in the world (Wikipedia 3). Ironically, the logic seems to be inverted: usually the rational association is that greater achievement and level of performance will be rewarded with earlier retirement, but this is not the case in Indonesia. Older researchers, when approached about this odd logic, appeared to want to pursue group 4 status so as to maintain a higher revenue stream and to stay active for longer. However, this inverse logic may actually stimulate many scientists from pursuing international publications or even self-demotivation so as not to reach group 4, almost purposefully. If this were the case, even for only some scientists, this would seriously undermine the validity and logic of the system and be creating a demotivating force within a pseudo-motivating system.

In all groups, publication of a paper in a national journal (in Indonesian or in English) will land them 25 points while an international publication will net 40 points (Table 7). Within the national publications, these must be in IIS-accredited journals, although the list of ME-accredited journals (Online Appendix 1) and IIS (LIPI)-accredited journals (Online Appendix 2) is ironically, and radically, different. What is curious is that 80% of all points are derived

from publications. The remaining 20% of points are allocated for all activities instead of publications such as teaching, guiding junior researchers/students, taking part in training, seminars, workshops, publishing technical books, involvement in journal editorial boards, etc. These points are then further divided among the number of scientists, although the percentage allocation depends on the position of the author and who is the corresponding author (see detailed explanation below for national and international journals; one author = 100%; two authors = 60% (first author) + 40% (second author); three authors = 50% (first author) + 25% (second and third author); four authors = 40% (first author) + 20% (second, third and fourth author); more than four authors = 40% (first author) and 60% divided in equal portion for the rest authors. Therefore, for example, a paper containing 5 authors, submitted to a national or international journal would net the following points. In all cases, the first author is always considered to be the corresponding author (CA). How the CA is selected is explained in more detail later. Therefore, for a group 1 scientist, for example, who publishes one paper a year in an Indonesian journal, and who is a single author of a paper, could theoretically obtain exactly 100 points within 5 years and thus be elevated to group 2. This would seem like a fairly easy objective since it is apparent that publishing one paper in an Indonesian journal is not difficult (relative to international journals). However, there are some serious flaws in the logic of this system, and this will prove problematic as Indonesia moves forward into the next 3-5 years of global science integration.

Understandably, when one uses a point system to

reward scientists financially, then the system is subject to fraud. Regrettably, when money enters the equation, the risk of fraud is always high and emotions such as envy or competition enter into the equation, which distort the positive image of science because they are issues that are totally unrelated to the pure notion of science i.e., information discovery. Therefore, and almost rhetorically and blatantly obvious, someone who knows *a priori* that they will be getting a better salary, a higher position or greater research funding based on the ability to gain more points, will be tempted to game or cheat the system to their advantage. Herein, the issue of inherent integrity and personal honesty in science, without which the system would collapse.

Cases (national journals)

Let's imagine that a paper will be published in an ME or IIS-accredited journal such as the Indonesian Journal of Agricultural Science (www.pustaka.deptan.go.id: Indonesian Center for Agricultural Library and Technology Dissemination), Indonesian Journal of Biotechnology (www.ijbiotech.ugm.ac.id; Research Center for Biotechnology; Gadjah Mada University) or the Hayati Journal of Biosciences (www.journal.ipb.ac.id; Bogor Agricultural University). The point system would be as follows:

- 1) 1 author: 25 points.
- 2) 2 authors: 15 points for author 1, 10 points for author 2.
- 3) 3 authors: 12.5 points for author 1, 6.25 points each for authors 2 and 3.
- 4) 4 authors: 10 points for author 1, 5 points each for authors 2, 3 and 4.
- 5) 5 authors: 10 points for author 1, 3.75 points each for authors 2, 3, 4 and 5.

The above is for high-level national accredited-journals with high scientific content of paper according to IIS. The points can be reduced to be 22, 20 or even 18 points if the scientific content is not a high level. For papers published in national proceedings with a review process and high scientific content, one paper can have 15 points (maximum) although the number of points can be reduced if the scientific content is not of a high level as established for proceeding standards. In this case, the 15 points will be divided as follows:

- 1) 1 author: 15 points.
- 2) 2 authors: 9 points for author 1, 6 points for author 2.
- 3) 3 authors: 7.5 points for author 1, 3.75 points each for authors 2 and 3.
- 4) 4 authors: 6 points for author 1, 3 points each for authors 2, 3 and 4.
- 5) 5 authors: 6 points for author 1, 2.25 points each for authors 2, 3, 4 and 5.

In all cases:

- a) author 1 = CA.
- b) seniority is not important and does not play a role.
- c) authorship is decided by the authors and is not determined by the rules of a journal of publisher.

Most likely a group 1 scientist would never be in a position to write a paper on their own, either due to a lack of experience or skill. Thus, hypothetically, a scientist who is an author in position 2-5 in a 5-author paper, and who remains in such a position for all papers, would require 40 years to reach the required 100 points to increase from group 1 to group 2 while a scientist who is the CA would need 7 years (assuming one paper per year in both cases). Naturally, this would snow-ball into a negative effect in which scientists who would be or feel under pressure to show their activity or performance, would chop and change authorship position to assure higher points, only if they were considered to be the CA. This then begs the question: who can or should be the CA in the Indonesian system of publishing (national or international papers)? The answer: the first author is **always** the CA. The second risk that this system introduces is the introduction of guest authors, i.e., individuals who did not contribute to any significant or important aspect of the manuscript or the research contained

therein. Since there is absolutely no way of verifying or quantifying the amount of work conducted by each author, this leaves the system open to fraud and abuse.

Cases (international journals)

Let's now imagine that a paper will be published in an DGHE-ME- or IIS-accredited international journal (no such lists exist in English) such as the Pakistan Journal of Plant Science or Scientia Horticulturae (Elsevier).

- 1) 1 author: 40 points.
- 2) 2 authors: 24 points for author 1, 16 points for author 2.
- 3) 3 authors: 20 points for author 1, 10 points each for authors 2 and 3.
- 4) 4 authors: 16 points for author 1, 8 points each for authors 2, 3 and 4.
- 5) 5 authors: 16 points for author 1, 6 points each for authors 2, 3, 4 and 5.

The number of points will decrease depending on if it is DGHE- or IIS-accredited and on whether the scientific paper holds a high level position (**Table 1**). The number of points can be reduced if the terms of evaluation do not fall within the DGHE and IIS criteria. Unpublished papers are valued at 5 points or lower depending on the scientific content.

In all cases, authorship, author position and authorship seniority follow the same rules as for national journals, explained above.

Thus, hypothetically, a scientist who is an author in position 2-5 in a 5-author paper, and who remains in such a position for all papers, would require 26-10 years for national high accredited-journals; 16-44 years for national high level proceedings, and 6-17 years for international high level journals (high IF[®]) to reach the required 100 points to increase from group 1 to group 2 while a scientist who is the CA would need 4-11 years (assuming one paper per year in both cases). The risks would be identical as for national journals but the chance of fraud would now be higher because the possibility of gaining more points and thus better rewards would be higher.

In all cases in this manuscript, and within the Indonesian system, however, the fact that a journal loses its IF is not considered at all, nor is the "predatory" nature of the publication (according to www.scholarlyoa.com).

Based on our own independent analysis and assessment over a 4-year period, all Indonesian researchers following the (4 + 1) regulations, Group 1 researchers need at least 2 papers published in national accredited journals (as listed by DGHE or IIS), or 3 papers published in national qualified proceedings **per year**, without fail. Group 2 researchers need at least 3 papers published in national accredited journals (as listed by DGHE or IIS), or 4 papers published in national high qualified proceedings, or 2 papers in international journals with international editors and reviewers **per year**, without fail. Grade 3 (which is generally considered to be a more difficult position) researchers need at least 5 papers published in national accredited journals (as listed by DGHE or IIS), or 7 papers published in national qualified proceedings, or 3 papers in international journals **per year**, without fail. For young-top level researchers (i.e., Initial Grade 4), which is considered to be the most difficult position, researchers need at least 6 papers published in national accredited journals (as listed by DGHE or IIS), or 8 papers published in national qualified proceedings, or 3 papers in international journals **per year**, without fail. However, senior researchers (Grade 4) only need 1 paper published in a national accredited journals (as listed by DGHE or IIS), 2 papers published in national qualified proceedings, or 1 paper in international journals **per year**, without fail just for maintaining their position. At the highest level of researcher carrier, each researcher only needs 25 credits every two years for maintaining that position. This is because at this level, every researcher has many institutional tasks relative to other level positions (Grade 1 to 3) in addition to research proposals, judging, reviewing, editing,

managing, watching, and guiding, especially young researchers under their supervision and position, both in internal and external institutions, etc. The control methods currently in place are lacking and insufficient, however.

Unofficial communication with a member of paper judgement team for researcher functional level of the Indonesian Center of Horticulture Research and Development (ICHORD) for first and young researcher level (i.e., Grades 1 and 2), especially for international papers, there is **no significant effect** of a journal's IF on a paper's point/score. Rather, an international paper will be given a high/maximum score if members of the journal editorial boards come from at least 3 different countries out of Indonesia and have "good scientific content" according to the evaluation results of the paper judgement team. The evaluation parameters are not publically available.

IS THE SYSTEM FAIR, BALANCED AND CORRECT?

As can be appreciated throughout this paper, there are serious deficiencies and incongruencies in the Indonesian system of rewards for scientists that undermine its effectiveness. These serious flaws and problems seem to reflect the partial or total ignorance of policy makers towards science and the implementation of a system that does not understand how science and scientists in fact function. It also reflects that this artificial system does not take into consideration real aspects of the wider global scenario of publishing.

For example, as a first case-scenario, the system does not take into account the type of research conducted. It is understandable that a microbiologist or organic chemist would be able to generate a data set (potentially/hypothetically) within days, or at most 1-2 weeks while a plant breeder, a molecular biologist or agronomist would require many months, if not years, to generate one good and reliable set of data. In all cases, the assumption is that the experiment is successful, which is not always the case since in science, the outcome can be negative, in many or most cases (the underlying assumption is that a negative result is not considered to be a publishable result). Thus, the latter group of scientists would be under extreme pressure to generate a data set suitable for publication in a national journal and under even more pressure for an international publication.

Secondly, there do not appear to be written rules that indicate how a CA should be selected, who can or should be an author, and even more importantly, who should not be a co-author.

Thirdly, even though an international collaborator may be a co-author, the point system does not apply to that international scientist(s), and instead of allocating that international scientists' points evenly or equally among the remaining Indonesian scientists, these points of this international co-author are literally lost in the wind.

Fourthly, there are no clear ethical guidelines established by or written by the ME or IIS that detail, in fine-scale what is ethical and what is unethical in research and science publishing. Although there is a broad understanding of what is or should be ethical behavior in the laboratory and in the world of publishing, fraud and corruption appear to be rampant (unquantifiable) while "favours for friends" seems to be quite wide-spread.

Finally, the quality of a journal in which a paper is published is not taken into consideration. Therefore, whether a paper is published in an Impact Factor (IF) journal or in a non-IF journal, or whether published in Nature or in the Pakistan Journal of Plant Sciences does not affect the outcome of points, i.e., in all cases, the points received will be identical, always with a maximum of 40 points. The "predatory" nature of a journal, especially OA journals, is also not taken into consideration. Quite obviously, this will spur most Indonesian scientists to aim for low level international journals, preferably those that offer easy or a quick peer

review system, which is in itself false or flawed, because this is the easiest and most convenient choice. Most high level journals will take anything from 4-12 months (in some cases 18 months to 2 years) to complete the peer review process, which would be totally disjunct with the time-scale of the Indonesian point system. Thus, there would be zero motivation (except personal self-improvement) to try and publish in a good, high level international journal.

These issues are critical and as Indonesia strives to assert itself as an important layer in the world of science, it cannot follow this desire and aim blindly or without careful reflection and consideration of the issues underlying science. When policy and rules are not built on logic or are deeply and inherently flawed, Indonesian scientist will not feel supported by the system. Rather, they will feel cheated and manipulated by it, to serve third party interests that go beyond their call of duty towards science. In the "Indonesian experience", many pertinent lessons may be found for other emerging and developing societies that are keen to enter the world of international publishing.

ACKNOWLEDGEMENTS

The authors wish to thank Dr. Dita Agisimanto and Dr. Muchdar Soedarjo (ICISFRI (Indonesian Citrus and Subtropical Fruits Research Institute), Malang, Indonesia), as well as Prof. Roedhy Poerwanto (ICP-BAU (Institute of Plant Biotechnology – Bogor Agricultural University), Bogor, Indonesia) for essential structural and logistical support to complete the workshop in September, 2012, for words of advise and counsel, and for great moments of inspiring friendship, insight and camaraderie.

Memorable quotes (in response to the workshop and what was learnt)

"A quantum leap in information" Agus, Malang

"It opened our minds" Yenni, Malang

"We were hoping you would open a window for us. Instead, you opened all the windows and smashed down the house" Suzi, Malang

REFERENCES

- Center of Educating, Guiding and Training of Researcher, Indonesian Science Institute (2006b) Accreditation Guideline of Scientific Publication, 46 pp
- DGHE-IDE (Directorate General of High Education, Indonesian Department of Education) (2006a) Accreditation Guideline of Scientific Publication 23 pp
- Indonesian International Journal Lists (Indexed by Scopus) Available online: <http://www.kopertis12.or.id>
- Koodinator Perguruan Tinggi Wilayah (2012) Available online: <http://www.kopertis12.or.id/2011/12/13/13047.html>
- SJR (SCImago Journal and Country Rank, Thomson Reuters) (2012) Country rankings. Available online: <http://www.scimagojr.com/countryrank.php>
- Strategic Plans of Agriculture Research and Development (SPARD) (2010) Strategic Plans of Agriculture Research and Development 2010-2014. Indonesian Agency for Agriculture Research and Development (IAARD). Indonesian Agriculture Ministry, 120 pp
- Sukristiyonubowo, Ritung S, Nugroho K (2012) Nitrogen and potassium balances of newly opened wetland rice field. *International Research Journal of Agricultural Science and Soil Science* 2 (5), 207-216
- Teixeira da Silva JA (2011) The ethics of collaborative authorship. *EMBO Reports* 12, 889-893
- Three-Hundred (300) Innovative Technologies of Agriculture Research and Development (2012) Indonesian Agency for Agriculture Research and Development (IAARD). Indonesian Agriculture Ministry. Available online: <http://www.litbang.deptan.go.id>
- Wikipedia 1 (2012) Indonesia. Available online: <http://en.wikipedia.org/wiki/Indonesia>
- Wikipedia 2 (2012) List of top international rankings by country. Available online: http://en.wikipedia.org/wiki/List_of_top_international_rankings_by_country
- Wikipedia 3 (2012) List of countries by life expectancy. Available online: http://en.wikipedia.org/wiki/List_of_countries_by_life_expectancy
- Worldaudit.org (2012) Available online: <http://www.worldaudit.org/corruption.htm>

WEB-SITES USED TO ACCESS INFORMATION FOR THIS PAPER (ALL LAST ACCESSED FEBRUARY 5, 2013)

www.realonlinedegrees.com (2012) Education rankings by country.
<http://www.realonlinedegrees.com/education-rankings-by-country/>
<http://www.wonogiripos.com> (2012) PUBLIKASI ILMIAH: Sebagian Besar PTS Sulit Penuhi Aturan Publikasi Ilmiah.
<http://www.wonogiripos.com/2012/nasional/pendidikan/publikasi-ilmiah-sebagian-besar-pts-sulit-penuhi-aturan-publikasi-ilmiah-169522>
<http://koran.kompas.com> (2009a) Pengelola Jurnal Kesulitan Naskah.
<http://sahhala.wordpress.com/2009/08/13/pengelola-jurnal-kesulitan-naskah-mencerminkan-mutu-penelitian/>
<http://koran.kompas.com> (2009b) Sulit Buat Jurnal Internasional.
<http://koran.kompas.com/read/xml/2009/08/13/03423384/sulit.buat.jurnal.internasional>
<http://indonesiabuku.com> (2009) Bahasa Jadi Kendala Karya Ilmiah.
<http://indonesiabuku.com/?p=1645>
<http://public.kompasiana.com> (2009) Sulitnya Membuat Jurnal Ilmiah.

<http://public.kompasiana.com/2009/08/19/sulitnya-membuat-jurnal-ilmiah/>
<http://koran.kompas.com> (2009c) Pengelola Jurnal Kesulitan Naskah, Mencerminkan Mutu Penelitian.
http://waraskamdi.com/index.php?option=com_content&task=view&id=36&Itemid=1
<http://www.antaranews.com> (2012) Kemdikbud: jurnal Indonesia belum banyak terindeks internasional. <http://www.antaranews.com/berita/341464/kemdikbud-jurnal-indonesia-belum-banyak-terindeks-internasional>
<http://manajemen.fem.ipb.ac.id> (2013) Pertemuan Komisi Departemen Manajemen dengan Direktur Riset dan Kajian Strategis-IPB
http://manajemen.fem.ipb.ac.id/index.php/event/detail/pertemuan_komisi_depar_temen_manajemen_dengan_direktur_rijet_dan_kajian_stra
Indonesian Scientific Journal Database (2012) <http://isjd.pdii.lipi.go.id/>
<http://www.dikti.go.id> (2012) Akses Terbuka untuk Jurnal Ilmiah.
<http://www.dikti.go.id/?p=5675&lang=id>
<http://www.pdii.lipi.go.id> (2012) Jumlah Jurnal Ilmiah Masih Sangat Minim.
<http://www.pdii.lipi.go.id/read/2012/02/08/jumlah-jurnal-ilmiah-masih-sangat-minim.html>

Appendix 1 Case study 1 of fictitious scientists, plagiarism and false data, addresses, etc.

Source: <http://sains.kompas.com/read/2012/08/29/14262313/Cyber.Crime.di.Dunia.Ilmiah.Wajib.Diwaspadai>

Cyber Crime di Dunia Ilmiah Wajib Diwaspadai

Penulis: Yunanto Wiji Utomo | Rabu, 29 Agustus 2012 | 14:26 WIB

Makalah di Scholarly Journal of Agricultural Science yang mencantumkan nama Nono Lee dan Pejabat Palsu sebagai author.

TERKAIT: Agnes dan Inul Dicatat di Makalah Jurnal Internasional

JAKARTA, KOMPAS.com - Wakil Kepala Lembaga Ilmu Pengetahuan Indonesia (IIS), Endang Sukara, mengatakan bahwa komunitas ilmiah juga harus mewaspadaai cyber crime.

"Sekarang di internet, kejahatan dalam dunia ilmiah itu ternyata juga ada," katanya saat dihubungi *Kompas.com*, Rabu (29/8/2012).

Salah satu bentuk cyber crime yang terjadi dalam dunia ilmiah adalah pencatutan nama Agnes Monica dan Inul Daratista dalam publikasi berjudul "*Mapping Indonesia Paddy Fields Using Multiple-Temporal Satellite Imagery*" di African Journal of Agricultural Research edisi 24 Juli 2012. Nama dua selebritis itu dicantumkan berasal dari Institute of Danddut, Jalan Tersesat No 100, Jakarta, 10000, Indonesia.

Makalah dengan judul hampir sama, yaitu "*Mapping Indonesian Rice Areas Using Multiple Temporal Sateliite Imagery*", juga diterbitkan di Scholarly Journal of Agricultural Science. Bedanya, nama yang dicatat adalah Nono Lee dan Pejabat Palsu. Kedua nama dicantumkan berasal dari Institute of Technology of Medan, Jalan Tersesat No 100, Medan, Sumatera Utara 20000, Indonesia.

Endang mengungkapkan, komunitas ilmiah adalah komunitas yang membela kejujuran dan kebenaran. Validitas data diperhatikan mengingat data riset tak jarang melandasi kebijakan atau digunakan untuk kepentingan lain. Pencatutan ini mencemari nilai-nilai kejujuran yang diutamakan di kalangan peneliti.

Kasus pencatutan nama selebritis dalam publikasi ilmiah ini bukan kejahatan yang pertama. "Dulu saya pernah menerima undangan simposium di London. Akomodasi dan fasilitas disediakan. Kemudian setelah saya cek kepada teman-teman saya di sana, ternyata itu bohong, simposium itu tidak ada," jelas Endang.

Endang menuturkan, kejahatan di dunia maya kini sudah meluas dan menyentuh komunitas ilmiah. Motif melakukan kejahatan ilmiah seperti pencatutan nama belum diketahui. Namun demikian, kalangan peneliti pun wajib waspada.

"Peneliti harus berhati-hati, waspada. Seperti menerima undangan, kita pun harus mengecek lagi," papar Endang.

Editor: A. Wisnubrata