

Terms of Reference



Empowered lives.
Resilient nations.

GENERAL INFORMATION

Title: Data scientist for Agriculture
Project Name: Pulse Lab Jakarta/UN Global Pulse
Reports to: Data Scientist - Data Innovation & Policy Lead
Duty Station: Jakarta
Expected Places of Travel: N/A
Duration of Assignment: January 2020 – June 2020 (120 working days)

REQUIRED DOCUMENT FROM HIRING UNIT

X	TERMS OF REFERENCE
	CONFIRMATION OF CATEGORY OF LOCAL CONSULTANT, please select: (1) Junior Consultant (2) Support Consultant (3) Support Specialist (4) Senior Specialist (5) Expert/ Advisor
X	CATEGORY OF INTERNATIONAL CONSULTANT, please select: (6) Junior Specialist (7) Specialist (8) Senior Specialist
X	APPROVED e-requisition

REQUIRED DOCUMENTATION FROM CONSULTANT

X	P11/CV
X	Copy of education certificate
X	Completed financial proposal
X	Completed technical proposal

Need for presence of IC consultant in office:

- ☐ no requirement
☒ intermittent - *The consultant is required to conduct interviews at locations around Jakarta and undertake missions to countries where PLJ is operating across Southeast Asia and the South Pacific*
☐ full time/office based

Provision of Support Services:

Office space: X Yes ☐ No
Equipment (laptop etc): X Yes ☐ No
Secretarial Services ☐ Yes X No

Signature of the Budget Owner:

Petrarca Karetji
Head of Office, Pulse Lab Jakarta

I. BACKGROUND

In developing countries, agriculture production systems and households that manage these systems are highly complex and varied, across time and space. Current knowledge and data collection activities undertaken by many government agencies such as National Statistics Offices & Ministries of Agriculture, fall short of capturing this complexity and variety across both spatial and temporal dimensions. Many agencies and ministries depend on field surveys to better understand the relationship between crop yields and plot level farm management, to measure household level social, economic and demographic factors, as well as to develop and target crop productivity improvement related interventions. However, plot level data collection, and household level data collection is done differently by different agencies and ministries, with patchy metadata schema, with limited inter-operability between household characteristics and plot-level characteristics, and between surveys conducted by different entities. Additionally, survey-based data collection is a time-consuming process, with costs directly proportional to the sample size, and is prone to human errors.

Factors influencing agricultural productivity are varied and complex, that encompass household, plot-level and biophysical environment characteristics and interactions within. However, with such limited inter-operability, and patchy knowledge captured through surveys, it is difficult to build evidence around factors limiting productivity. Although, several governments are undergoing transformations in their data processes, the next recently there has been a data restructuring process, the next question is – What knowledge-based frameworks could be used to identify limiting factors, that could be further used to develop and implement targeted interventions.

Positive Deviance (PD) could offer an interesting knowledge-based framework to understand the above. The concept of PD is a social/behavioural science-based approach to uncover positive behaviours within individuals that belong to a homogenous community.

Data Scientist – Positive Deviance

The objective of this consultancy contract is to leverage upon varied sources of data (survey based – traditional such as Agricultural census, or non-conventional such as private sector farmer profiles), with relatively improved metadata structures, combined with big data sources (remote sensing/GIS), use big data analytics, and develop proof-of-concepts to identify farmers/farming communities with positive behaviour (i.e. positive deviants).

The scope of this contract is to contribute throughout the entire project in partnership with specific expertise of Pulse Lab Jakarta. The consultant will be a data scientist, with agriculture expertise, and will work with the team at Pulse Lab Jakarta, that will include a Project Officer, Remote Sensing/GIS support, and a Positive Deviance expert (already on board as UN Global Pulse Fellow). The aim is to create an end product and a research method that can be replicated on agricultural intervention projects across Indonesia and South East Asia with the knowledge created being disseminated through Global Pulse, GIZ and UNDP networks.

Work Relationships

The Data Scientist – Positive Deviance will report to the PLJ's Data Scientist Lead (Data Innovation & Policy Lead) or, as assigned, to other senior members of Pulse Lab Jakarta.

II. SCOPE OF WORK, ACTIVITIES AND DELIVERABLES

Pulse Lab Jakarta would like the Data Scientist to provide big data analytics and methodology, key findings and recommendations to be used by PLJ in refining its prototypes to ensure they are ready to use.

The scope of work consists of:

- Scoping report, summarizing the use of 2013 Indonesia agricultural census, private sector farmer records from 8 villages (Indonesia) and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) region wide RIICE program data.
- a. The report will summarize necessary data requirements, applications, potential analytical approaches and potential results to identify positive deviants using big data approaches.
- Technical report explaining the methodology, results to identify positive deviants in agriculture using 2013 Agriculture census data (official data), in combination with remote sensing data (big data).

- Technical Progress report outlining data and analytical exploration approaches for identifying positive deviants, using agricultural and farm records from 8villages (Non-Conventional data; Indonesia) in combination with remote sensing data (big data).
- Technical report presenting the methodologies and results to identify positive deviants in agriculture using private sector agricultural and farm records from 8villages (Non-Conventional data; Indonesia) in combination with remote sensing data (big data).
- Technical Progress report outlining data and analytical approach exploration for identifying positive deviants using GIZ's regional RIICE program data (non-conventional data), in combination with remote sensing data (big data).
- Technical report presenting the methodologies and results to identify positive deviants in agriculture from exploring GIZ's regional RIICE program data (non-conventional data), in combination with remote sensing (big data).
- Develop communication material (1 blog article) to introduce the concept of positive deviance, describe the learnings from the studies, and describe potential opportunities for big data analysis to identify positively deviant behaviour in agriculture.
- Develop a concept note for a workshop to present the results from the initial scoping analyses on positive deviance and co-design a large scale pilot
- Develop a research design for large scale pilot, identifying partners, specific methodologies, based on the learnings from the initial scoping analyses on positive deviance, as well as the outputs of the co-design workshop

Expected deliverables:

Deliverables/ Outputs	Estimated Number Of Working Days	Target Due Dates	Review and Approvals Required
Scoping report, summarizing the use of 2013 Indonesia agricultural census, private sector farmer records from 8villages (Indonesia) and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) region wide RIICE program data. The report will summarize necessary data requirements, applications, analytical approaches and potential results to identify positive deviants using big data approaches.	15	27 January 2020	Data Scientist Lead (Data Innovation & Policy Lead)
Technical report explaining the methodology, results to identify positive deviants in agriculture using 2013 Agriculture census data (official data), in combination with remote sensing data (big data).	20	24 Feb 2020	Data Scientist Lead (Data Innovation & Policy Lead)
Technical Progress report outlining data and analytical exploration approaches, for identifying positive deviants, using agricultural and farm records from 8villages (Non-Conventional data; Indonesia) in combination with remote sensing data (big data).	10	09 March 2020	Data Scientist Lead (Data Innovation & Policy Lead)
Technical report presenting the methodologies and results to identify positive deviants in agriculture using private sector agricultural and farm records from 8villages (Non-Conventional data; Indonesia) in combination with remote sensing data (big data).	20	10 Apr 2020	Data Scientist Lead (Data Innovation & Policy Lead)
Develop communication material (a blog article) describing the learnings from the studies and describe potential opportunities for	5	20 April 2020	Data Scientist Lead (Data Innovation & Policy Lead)

big data analysis to identify positively deviant behaviour in agriculture.			
Technical Progress report outlining data and analytical approach exploration for identifying positive deviants using GIZ's regional RIICE program data (non-conventional data), in combination with remote sensing data (big data).	10	6 May 2020	Data Scientist Lead (Data Innovation & Policy Lead)
Technical report presenting the methodologies and results to identify positive deviants in agriculture from exploring GIZ's regional RIICE program data (non-conventional data), in combination with remote sensing (big data)	20	5 June 2020	Data Scientist Lead (Data Innovation & Policy Lead)
A concept note, which will outline the research design, plan and implementation a large –scale pilot for a positive deviance project, either in Agriculture or other sectors (e.g. Health, Urban Planning etc.) for Indonesia (?).The concept note, will leverage on insights and knowledge derived from the past positive deviance work in Agriculture, and will mention specific methodologies and partners	20	6 July 2020	Data Scientist Lead (Data Innovation & Policy Lead)

III. WORKING ARRANGEMENTS

The advisor will report to the Data Scientist Lead (Data Innovation & Policy Lead) and will liaise closely with the rest of the team. In the performance of her/his duties the advisor will engage with Pulse Lab Jakarta's partners. The assignment involves 120 working days within 6 months, with completion expected by 30th June 2020. The work will be Jakarta based.

IV. REQUIREMENT FOR EXPERIENCE AND QUALIFICATIONS

I. Academic Qualifications:

- PhD or Master degree (or equivalent) in Engineering, Philosophy, Science, Statistic or other related disciplines.

II. Experience:

- At least seven (7) years of relevant professional work experience managing and analytics data.
- Experience working with big data for agriculture production systems
- Experience working with data life-cycle, including data capture/collation, storage and analysis of complex, high dimensional datasets, obtained from varied data sources, which include geotagged ground data such as farm level productivity and crop management practices, household level socio-economic, demographic data, and remotely sensed biophysical data (climate, weather and soil quality indices).
- Experience in develop machine learning based predictive analytical approaches.
- Experience in working with Government, NGO, INGO and UN Agency.

III. Competencies:

- Demonstrates expertise working with several type of data and/or big data.

- Contributes effectively to team-based activities, working collaboratively and sharing information openly; works effectively with colleagues as well as with partners and other stakeholders to pursue common goals;
- Facilitates and encourages open communication in the team, communicating effectively;
- Remains calm, composed and patient when facing conflict, manages conflict productively, focusing on mutually acceptable solutions;
- Takes initiative and seeks opportunities to initiate action;
- Actively produces and disseminates new knowledge; creates/contributes to mechanisms to collect and share knowledge;
- Good database skills;
- Proposes innovative ideas and new solutions to challenges.

IV. Functional Competencies:

- Ability to speak and write persuasively in English, adapting style and content to different audiences;
- Proficient in speaking with wide range of stakeholders, from government counterparts to private sector companies;
- Ability to communicate insights, expertise and trends in a way that non-specialists can comprehend;
- Comfortable with several type of data;
- Good presentation skills in a workshop setting;
- Professional and intellectual interest in big data and humanitarian sectors.

V. EVALUATION METHOD AND CRITERIA

Individual consultants will be evaluated based on the following approach:

Cumulative analysis

When using this weighted scoring method, the award of the contract should be made to the individual consultant whose offer has been evaluated and determined as:

a) responsive/compliant/acceptable, and

b) Having received the highest score out of a pre-determined set of weighted technical and financial criteria specific to the solicitation.

** Technical Criteria weight; 70%*

** Financial Criteria weight; 30%*

*Only candidates obtaining a minimum of **70** points would be considered for the Financial Evaluation*

Criteria	Weight	Maximum Po
<u>Technical</u>		100
Criteria A: qualification requirements as per TOR:	70%	70
• PhD or master's degree (or equivalent) in Engineering, Philosophy, Science, Statistic or other related disciplines.		10
• At least seven (7) years of relevant professional work experience managing and analytics data.		10
• Experience working with big data for agriculture production systems.		15

• Experience working with data life-cycle, including data capture/collation, storage and analysis of complex, high dimensional datasets, obtained from varied data sources, which include geotagged ground data such as farm level productivity and crop management practices, household level socio-economic, demographic data, and remotely sensed biophysical data (climate, weather and soil quality indices). • Experience in develop machine learning based predictive analytical approaches. • Experience in working with Government, NGO, INGO and UN Agency.		15	
		10	
		10	
Criteria B: Brief Description of Approach to Assignment (based on technical proposal submitted as part of application)	30%	30	
1. Understands the task and applies a methodology appropriate for the task		10	
2. Important aspects of the task addressed clearly and in sufficient detail		10	
3. Logical, realistic planning for efficient project implementation.		10	