FEASIBILITY STUDY: CROWDSOURCING HIGH-FREQUENCY FOOD PRICE DATA IN RURAL INDONESIA

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PROGRAMME AREA: FOOD & AGRICULTURE

SUMMARY

This feasibility study used crowdsourcing to track commodity prices in near real-time in areas where the availability of other data sources was limited. High-resolution and high frequency food price trends were derived from reports generated by “citizen reporters”. The study was conducted in Nusa Tenggara Barat, one of Indonesia’s poorest provinces, comprised almost exclusively of informal, cash-only markets and stalls. The study involved recruiting a trusted network of local citizen reporters to submit food price reports via a customized mobile phone application. The tested crowdsourcing method could be improved by developing a standardised approach to the “bunch measurement” of staples so that it could be effectively deployed in locations where standardised weights and measures are absent. Crowdsourcing technologies, which capture high frequency data on local trends, are best deployed in areas where traditional data collection methods are difficult or costly due to a lack of geographic proximity, high insecurity, or high food price volatility.

BACKGROUND

The ability to monitor market commodity prices in real-time could provide critical information for policy decisions on food security and other economic issues. But not all countries have well-established systems for accessing and monitoring price data, especially at a high frequency. New approaches in price monitoring could help to fill this data gap in developing economies.

To complement existing monitoring systems, the feasibility study focused on remote areas, and on vulnerable consumer groups, through its targeting of informal markets.

Success of the feasibility study hinged upon two key aspects:

- The ability to create quickly a data capture network in Indonesia to provide accurate and frequent price data across a wide rural coverage area; and,
- The ability to accurately capture price trends in the coverage area across an unstructured set of trade outlets.

Global Pulse, through Pulse Lab Jakarta, worked with FAO and WFP, to define both the geographic areas and market “clusters” for the study, as well as the basket of items to capture through crowdsourcing, and collaborated with a technology company, Premise, to evaluate the efficacy of a distributed monitoring infrastructure.

CROWDSOURCING FOOD PRICES

Nusa Tenggara Barat, one of Indonesia’s poorest provinces, was selected for the study. Because of the rural nature of the province, the geographic clusters were comprised almost exclusively of informal, cash-only markets and stalls. The geographic scope of this engagement focused on the following areas:

- SUMBAWA ISLAND (circa 87 inhabitants/kilometre)
- LOMBOK ISLAND (not including Mataram City; circa 653 inhabitants/kilometre)
- MATARAM CITY (the most populated of the three areas; circa 6,563 inhabitants/kilometre)

The basket of commodities to be monitored was selected through a series of consultations with partners, which was informed by a review of national and provincial priorities on food security. The final list included staple foods, such as tofu, tempeh, chilies, mackerel and eggs, as well as liquefied petroleum gas (LPG). To produce quality price statistics, the network needed to generate a minimum of 30 price reports per commodity per week within each geographic area.

The process involved recruiting local “citizen reporters” to upload food price reports using a customized mobile application built by Premise. The reports included commodity name, price, GPS location and measuring unit, as well as meta-information such as a picture. The reporters were recruited through social media advertisements which had a viral effect within the local networks of students. Reporters were rewarded with mobile phone credit or mobile money based on their contributions. More than 200 active users across NTB province were recruited, each of whom contributed more than one report per month. For quality control purposes, reporters exhibiting fraudulent activities (for example those submitting duplicate reports using multiple accounts) were identified by a mixture of automatic and manual approaches and deactivated.

The size of the network of reporters, data fidelity and geographic coverage of the feasibility study demonstrated the potential of using crowdsourcing to collect food prices in Indonesia. These dimensions are explored in detail below.
This study demonstrated that crowdsourcing of prices can complement existing monitoring systems, especially in areas where data are absent, whether based on geography or due to a particular staple being absent from official indices.

The approach is analogous to computer-assisted personal interview applications, already widely used by national statistical offices in data collection. The crowdsourcing approach offers an added value in that it creates networks of reporters through social mobilisation and enables them to respond rapidly to data needs when required.

At the moment, the absence of international or statistical guidelines, however, limits the value of this data source in providing comparable cross-country data as it is not yet subject to government auditing and quality assurance.

The crowdsourcing method tested as part of the feasibility study could be improved by developing a standardised approach to “bunch measurement” of staples so that it could be effectively deployed in locations where standardised weights and measures are absent.

**CONCLUSIONS**

**INSIGHTS & OUTCOMES**

More than 65,000 data points were collected and 2,650 unique trade outlets were referenced across Lombok Island, Mataram City and Sumbawa Island covering approximately 20,000 square kilometres. By week six the data exceeded the minimum required to accurately capture price trends across most basket items within the coverage area.

The data can be mined for insights into which staples are driving increases or decreases in the price of the basket. In addition, the data were of sufficient density to enable the comparison of staple price trends between the coverage areas.

**IMPLICATIONS & RECOMMENDATIONS**

- Crowdsourcing technologies, which capture high frequency data on local trends, are best deployed in areas where traditional data collection methods are difficult or costly due to a lack of geographic proximity, high insecurity, or high food price volatility.
- In adopting approaches such as crowdsourcing through mobile applications, national statistical offices should consider technical, legislative and security issues, such as the stability of the application, the reliability of mobile networks, the security of confidential information transmitted, and the personal security of reporters.
- If a crowdsourcing tool is provided by a private sector entity, the complementarity of the approach to official data collection systems should be emphasised, as the continuity of the database is conditional on the continued operation of the business.
- During the design phase of a crowdsourcing project (or when designing for expansion of the approach into additional remote provinces), the level to which local data collection systems are absent or underperforming should be assessed in order to evaluate the potential of crowdsourcing for filling data gaps.

**REFERENCES**