Food and Agriculture Organization of the United Nations

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Fertilizer allocation methodology

Introduction

To facilitate the distribution of limited fertilizer resources to priority countries in need, a two-stage procedure is established: at stage 1, we create a set of criteria describing neediness of fertilizers for each country; at stage 2, we allocate available fertilizers to individual countries based on the neediness index possibly together with other informative indicators.

Relevant indicators to measure neediness

The following set of indicators has been chosen to measure neediness:

Table 1: Selected indicators and short descriptions

Indicator	Description
Change in K2O imports (%)	Percentage change in the imported quantity of K2O (potassic fertilizer), 2021/2022 over 2018/2021 3-year average
Change in N imports (%)	Percentage change in the imported quantity of N (nitrogenous fertilizer), 2021/2022 over 2018/2021 3-year average
Change in P2O5 imports (%)	Percentage change in the imported quantity of P2O5 (phosphate fertilizer), 2021/2022 over 2018/2021 3-year average
Score for current account stress (%)	percentage change in the current account deficit, 2022 over 2021
Prevalence of undernourishment (PoU, %)	Estimation for 2020
Prevalence of severe food insecurity (FIES, %)	Estimation for 2020
IPC/CH phase 3+ (%)	Share of people experiencing or facing high levels of acute food insecurity classified in Crisis or worse (IPC/CH Phase 3 or above)
Prevalence of Cash Crops (%)	Share of production of cash crops in total crop production, in values

In addition, we distinguish countries by their fertilizer trade status, flagged in the column "**net importer"**. Only net importers are assessed for their import neediness.

Standardizing indicators into scores

Before being further aggregated into a final neediness index, indicators are first mapped into homogeneous scores ranging from 0-100 based on quantiles of each indicator. Specifically, the indicators are converted into discrete scores with 5 quintiles and respective means of 10%, 30%, 50%, 70%, 90%.

When converting each indicator into a score, a positive or inverse relationship is implemented based on the nature of each indicator, i.e., a 'positive' relationship is applied when a higher value of an indicator indicates an increased neediness score, and the vice versa (Table 2)

Table 2: Relationships for converting neediness indicators to discrete scores

Indicator	Relationship with neediness
Change in K2O imports (%)	Inverse
Change in N imports (%)	Inverse
Change in P2O5 imports (%)	Inverse
Change in current account deficit (%)	Positive
Prevalence of undernourishment (PoU, %)	Positive
Prevalence of severe food insecurity (FIES, %)	Positive
IPC/CH phase 3+ (%)	Positive
Prevalence of Cash Crop (%)	Inverse

Aggregating scores into final indices

Aggregated neediness indices are calculated as averages of various subsets of scores (Table 3). The resulting indices are continuous values ranging from 0 to 100, i.e., the greater the index value, the higher the neediness of fertilizer by the country. There are no weights attached to the various scores. These could be added either based on political considerations or based on agronomic needs. For the latter, a separate study would be required.

Table 3: Coverage of scores of each aggregated neediness indices

Index	Coverage of indicators
Overall neediness	All scores
Overall neediness w/o cash crop measure	All scores but the prevalence of cash crops
Neediness by nutrient, K2O (%)	All scores but changes in IIB of N and P2O5
Neediness by nutrient, N (%)	All scores but changes in IIB of K2O and P2O5
Neediness by nutrient, P2O5 (%)	All scores but changes in IIB of K2O and N