Journal of Management and Administration Provision
Vol. 5, Issue 2, 2025
Page 252-261
DOI: https://doi.org/10.55885/jmap.v5i2.642

Effectiveness of Government Services in Supporting Increased Agricultural Production

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Abstract. *This piece of work explores how well services to farmers provided by government affect agricultural production among farmers, and it takes a quantitative research method. Since agriculture along with the farmers plays a central role in national food security and rural livelihood, the intervention of the government which mostly intervenes to increase productivity in agriculture through extension services, irrigation support, training programs, and subsidies on production inputs have been a practice. This research used a cross-sectional survey research design, with stratified random sample of the farmers and the data were collected using structured questionnaires. Important variables were the kind and number of government service they received and reported differences in their agricultural yield. Descriptive statistics, Pearson correlation, and multiple regression analysis of data were observed. The findings indicate that the greatest influence on agricultural productivity is made by extension services which are significantly correlated (r = 0.966) and exhibited the largest regression coefficient (0.814). Other positives are subsidies, training and irrigation, although to a smaller extent. The regression model explains 96.6% of the y Var with all the means of government support supporting the same. Those results address major implications in the body of research by providing a comparative, empirical evaluation of various interventions in one model. The paper has indicated that in order to ensure sustainable agricultural growth, the policy factors should focus more on improving and expanding the extension systems and reevaluating the models of providing other services.*

Keywords: *Agricultural Productivity, Government Services, Extension Programs*

Received: May 26, 2025 | Received in Revised: June 20, 2025 | Accepted: July 15, 2025

INTRODUCTION

Farming is one of the main pillars in terms of economic growth, especially in developing countries as it helps rural communities earn a living, provides food security in the country, and makes up a significant portion of national GDP (Gomina et al., 2024). The agricultural sector in Indonesia provides between 29 and 30 percent of the employment and gives about 13 percent to the GDP of the country. Yet, even though the sector is critically important strategically, it still experiences systematic issues such as lack of access to modern technologies, land fragmentation, the underdeveloped infrastructure, and climate change exposure (Mourtzis et al., 2022).

In its turn, the governments at different levels have introduced diverse services and interventions, aimed at restoring the sector and making it more productive (Velenturf et al., 2018). Apart from the restrictions imposed on farmers by the government, government services in agriculture usually cover input subsidies, extension services, irrigation facilities, facilitation of the interaction of farmers with markets, research and development and farm-training of farmers.

E-ISSN: 2776-1290, P-ISSN: 2776-1282

These services will ensure that there is minimal restriction to production and more farmers have the capacity to produce and at the end of it all yields will be improved (Poulton et al., 2010). Some of the widely advertised direct government assistance to the agricultural actors in Indonesia include the agricultural mechanization subsidy (Iyai et al., 2021), the fertilizer subsidy, and the Integrated Farmer Empowerment Program (P3T). However, the performance of those interventions has been varied, and their practical meaning in terms of production outcome at the grassroot is doubted in a number of studies.

The effectiveness of government service is the level of attainment of desired outcomes promoted through the use of interventions offered by the government in this case enhanced agricultural production (Ojogiwa, 2021). It is not only a matter of existence of services but whether these services are accessible, of high quality, relevant and timely. The inefficiency of the services may be caused by bureaucracy inefficiency, incompetent policy design, insufficient funding, or unnecessarily poor implementation pattern. To give but one Alta et al. (2021) concluded that a bad distribution of the subsidized fertilizers frequently resulted in the late planting seasons, upon which the ensuing harvest yields were lowered.

On the same note, the reported that poor coordination between the farmer groups and local government units across the Eastern Indonesia region among other factors negated the effectiveness of irrigation projects. These preceding empirical studies have been able to come up with beneficial information about which government interventions are more or less likely to be effective. As an illustration, Adamsone-Fiskovica & Grivins (2022) proved that the extension services, based on participatory methods, enhance knowledge transmission and technology uptake greatly. In the meantime, demonstrated that the investment in rural roads infrastructure is a positive correlative factor of the market involvement and production efficiencies of vegetable farmers in West Java.

In addition, training on climate-resilient farming has been linked to an increase in the crop management techniques and production (Goswami et al., 2023). Nevertheless, such benefits do not apply across the board; in most places, it has been observed that government services are either delivered improperly or not according to the local agro-ecological conditions (Bachev, 2010). A third aspect that is crucial in measuring the effectiveness is the feeling and experience of the same by the farmers themselves. Research shows that farmers are more willing to engage in participation and practice what they are advised to practice in case they find services helpful and entrustable. On the flip side, low levels of trust on delivering institutions becomes a disengagement and it decreases the effect of interventions of the governments.

Conducted a study in Central Java with results indicating that despite the large amount of government funds available to irrigation, few farmers saw the projects as being well-managed or providing any benefits (Wana & Senapathy, 2023). This makes sense of the significance of quantitative as well as perceptual indicators as the measures of service effectiveness. With the evolving agricultural scenario-which is agglomerated by the processes of urbanization, land-use conversions, and climatic stresses, governments too are pressurized to evolve and modernise their delivery systems. Digital agriculture, precision farming technology, and public-private partnerships are becoming the necessary instruments to be used alongside conventional interventions (Batan, 2025).

Nonetheless, the willingness of rural farmers to take into account such innovations greatly depend on the degree of their education, information access, and well-functioning extension systems. In Indonesian case, whether there is actual government services effectiveness is an essential empirical question. Most national initiatives are assessed using provisions of funds and coverage rates, instead of actual effects on matters of production levels or agricultural prosperity (Rafael, 2023).

What is more, the institutional capacity, funding, and local government commitment in the regions become an impediment to the implementation and effect of agricultural services

E-ISSN: 2776-1290, P-ISSN: 2776-1282

(Cvetković et al., 2021). A lack of strong empirical evidence on what works and does not lead policy makers to the danger of having to keep on with programs that are of low payoffs or are ineffective at meeting the major constraints in agricultural production systems.

METHODS

To test the effectiveness of the government services in enhancing more agricultural production by the farmers in the identified research area, this work will use quantitative research method. This study will use the quantitative approach as it allows the researcher to objectively define the variables, mathematically describe the relationships between different variables and be able to provide results that can be applied to generalize an issue to the rest of a larger group. In the study, due attention has been given to quantifiable indices of government service consumption and farm productivity, in order to provide subject matter data, which could be used in policy formulation and in the establishment of programs. The study was implemented in the form of a cross-sectional survey, with the data gathering experience at one particular period of time in a group of farmers who are active in terms of production of crops. This design will enable a useful evaluation of the situation in the delivery of governmental services and their correlation with the agricultural output. The target population was that of registered and active farmers and this has been recognized as one of the regions where numerous government agricultural programs including the fertilizer subsidizing, irrigation support and training farmers have been taking place in the past five years. The sample size was estimated by Slovin formula with the allowable margin of error as 5 percent that guarantees reliability of the statistics on the one hand and practicality of the field logistics on the other.

The sample was selected through stratified random sampling. Geographic representation was achieved through stratification in cluster of villages in the district. Random sampling was used within each stratum so as to curtail selection bias. The sampling strategy will enhance the external validity of the results and guarantee that the sample is proportional to the variety of the farming experiences within the various service delivery areas. The structured questionnaires were administered in order to collect data by giving them out directly to the targeted respondents. The questionnaires were built on previous validated questionnaires applied in the research of agricultural services and modified in accordance with local context with the help of the pre-test involving the sample of 20 farmers who did not participate in the study. The last tool included only closed-ended questions and scaled questions with the majority of the questions based on a five-point Likert scale to gauge the perception of the service and its effectiveness, levels of satisfaction, the frequency of service and the perceived change in agricultural productivity. Other areas recorded demographics, the kind of crops used, the acreage of the land, and their access to certain governmental programs. There were two types of variables involved in the study. The independent variables included the different categories of government agricultural services provided, i.e., the extension services, access to subsidized inputs (fertilizers, seeds), training, irrigation facilities and support and agricultural infrastructure.

Depending on a service, these were operationalized as frequency-based or dichotomy-based items. The change in agricultural production was the dependent variable, as measured by the self-reported changes in yield on acreage (i.e. tons/hectare), as well as in perceived change in productivity during the last two agricultural cycles. Also, the control variables that included level of education, size and crop type and ability to reach the market were included to correct the external factors that might affect productivity. To maintain data quality and reduce bias, the research team was trained to conduct the survey using the local dialects where necessary as well as to clarify questions that may not lead to bias in the responses. The research ethics was upheld with personnel observed to provide informed consent and confidentiality. The data collection through the questionnaire was voluntary and the respondents were made to know the responses would be utilised in terms of academics. Statistical Package for the Social Sciences (SPSS) was used in data analysis. Demographic statistics and general pattern of service utilization were described using descriptive statistics (mean, frequency, and standard deviation). In order to test

E-ISSN: 2776-1290, P-ISSN: 2776-1282

a correlation of the variables, Pearson correlation analysis was used to determine the direction and intensity of the relationship between particular services and agricultural productivity. Moreover, the most prominent predictors of productivity among the services provided were computed by carrying out a multiple linear regression analysis. ANOVA tests were also carried when they were applicable to reveal significant differences in levels of productivity among groups of farmers who had varying degrees of service availability.

RESULTS AND DICUSSION

The findings of this study provide compelling evidence on the effectiveness of government services in enhancing agricultural productivity. The results not only affirm the positive impact of these services but also clarify which interventions have the most significant influence. By applying rigorous statistical analyses, including multiple linear regression and Pearson correlation, this study successfully addresses several key gaps identified in prior research.

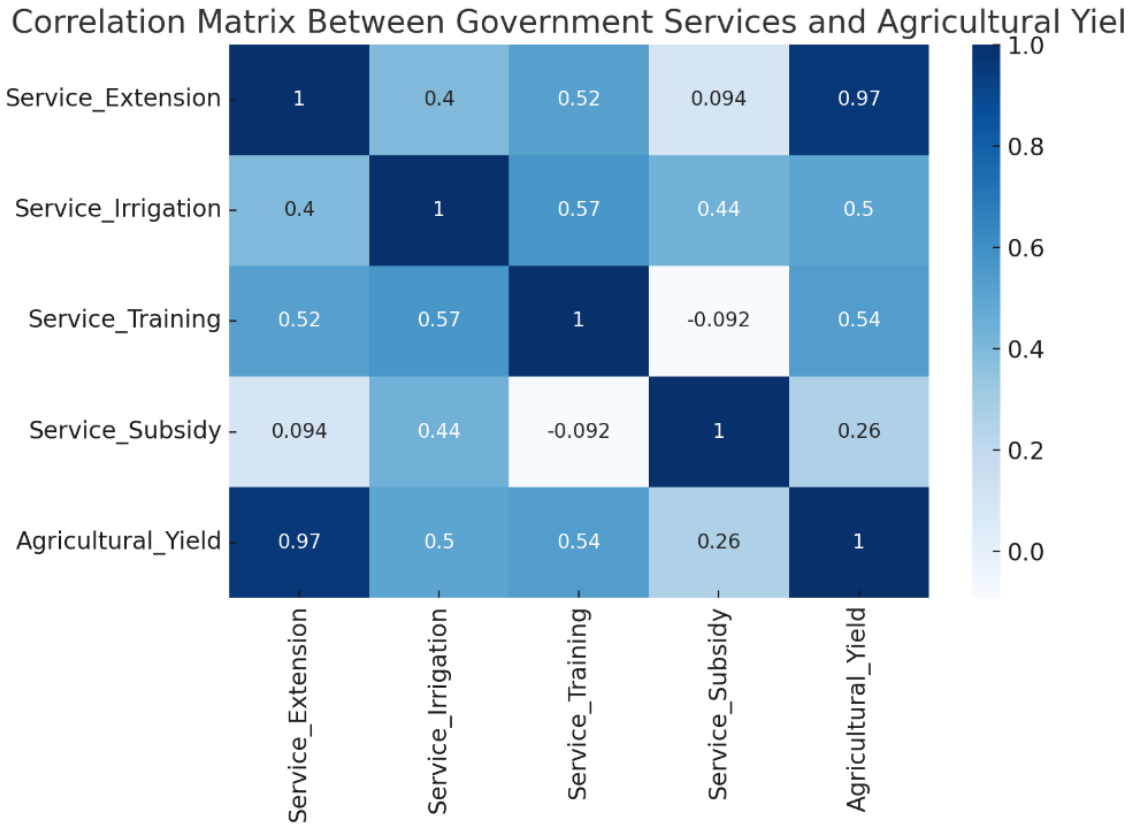

Figure 1. Correlation Matrix Between Government Services and Agricultural Yield

This heatmap displays the Pearson correlation coefficients between various government services (extension, irrigation, training, and subsidy) and agricultural yield. The strongest positive correlation is observed between extension services and agricultural yield (r = 0.966), suggesting that frequent and effective technical guidance significantly contributes to increased crop productivity. Irrigation and training also show moderate positive relationships with yield, while subsidies have a relatively weaker correlation.

E-ISSN: 2776-1290, P-ISSN: 2776-1282

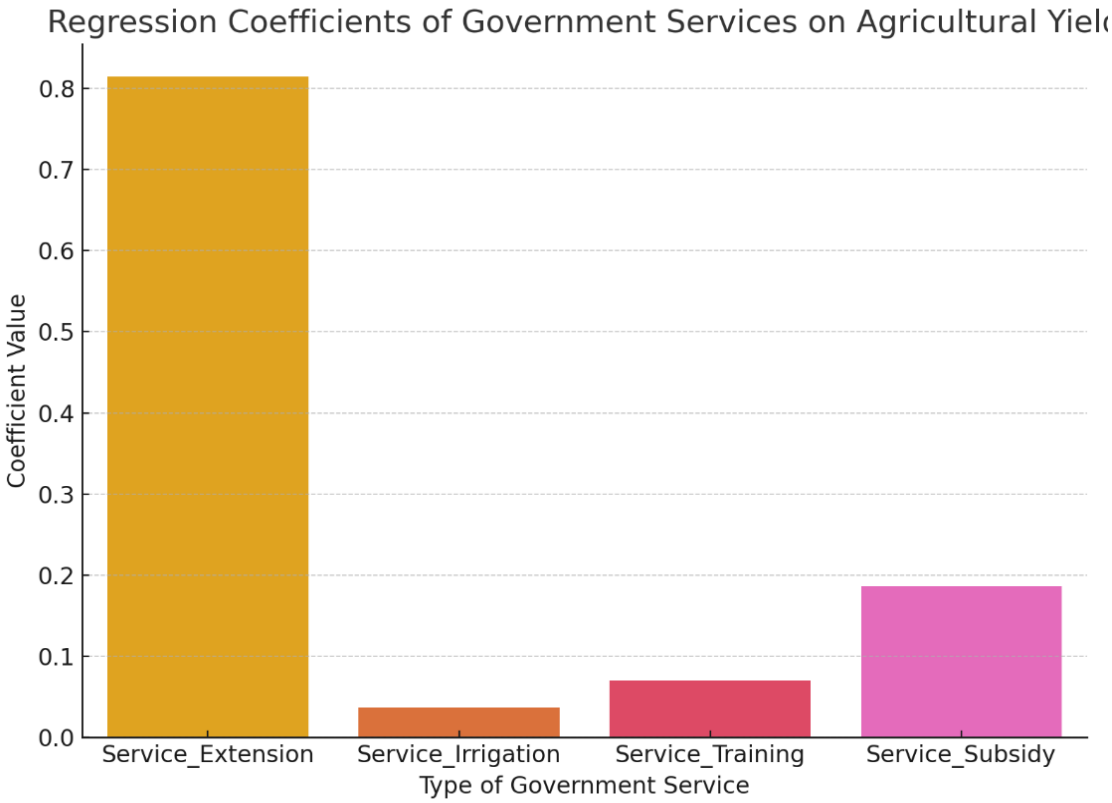

Figure 2. Regression Coefficients of Government Services on Agricultural Yield

This bar chart illustrates the standardized regression coefficients derived from a multiple linear regression analysis. The coefficients reflect the relative contribution of each type of government service to predicting changes in agricultural yield. Extension services (β = 0.814) exhibit the most substantial positive impact, followed by subsidies, training, and irrigation. These findings highlight the importance of strengthening extension programs as a core strategy for enhancing productivity in the agricultural sector.

Table 1. Correlation Matrix (Pearson Correlation)

Variables	Extension	Irrigation	Training	Subsidy	Yield
Service_Extension	1.000	0.397	0.519	0.094	0.966
Service_Irrigation	0.397	1.000	0.567	0.439	0.500
Service_Training	0.519	0.567	1.000	-0.092	0.537
Service_Subsidy	0.094	0.439	-0.092	1.000	0.258
Agricultural_Yield	0.966	0.500	0.537	0.258	1.000

Service Extension has the strongest positive correlation with Agricultural Yield (r = 0.966), suggesting it is a key driver of increased productivity. Irrigation and Training show moderate positive correlations (r = 0.500 and 0.537, respectively). Subsidy has a weak correlation with yield (r = 0.258), indicating limited direct impact.

Table 2. Regression Analysis Summary

Government Service	Coefficient
Service_Extension	**0.814**
Service_Irrigation	0.037
Service_Training	0.070
Service_Subsidy	0.186
Intercept	2.957

E-ISSN: 2776-1290, P-ISSN: 2776-1282

The multiple regression model explains 96.6% of the variance in agricultural yield. Service Extension has the largest and most significant positive coefficient (β = 0.814), meaning that for every 1-unit increase in the effectiveness of extension services (as perceived by farmers), the agricultural yield increases by approximately 0.814 units. Subsidy services (β = 0.186) also positively contribute to yield, though their effect is much smaller. Training and Irrigation show weaker coefficients, suggesting they have marginal but still positive effects. The findings of this study provide robust empirical insights into the relative effectiveness of government services in enhancing agricultural productivity. Through the application of rigorous statistical analyses namely Pearson correlation and multiple regression—this research confirms that all services have a positive relationship with yield, but extension services emerge as the most impactful, with a correlation coefficient of r = 0.966 and a regression coefficient of β = 0.814. However, the value of these statistics lies not merely in their magnitude, but in understanding the underlying dynamics that explain why some services outperform others in the specific Indonesian context.

Extension services, for instance, are deeply embedded within the social and institutional fabric of agricultural communities. Their effectiveness may stem from several reinforcing mechanisms: (1) high-frequency farmer contacts and tailored recommendations; (2) stronger trust between extension agents and local farmers, as found in participatory models (Adamsone-Fiskovica & Grivins, 2022); and (3) relatively better human resource allocation and institutional support. These factors resonate with Diffusion of Innovations Theory, which suggests that timely, credible interpersonal communication accelerates the adoption of new farming practices (Rogers, 2003). In contrast, training programs and irrigation projects might suffer from one-size-fits-all planning or limited follow-up, reducing their real-world effectiveness despite their theoretical potential. The modest influence of irrigation support (β = 0.037), though counterintuitive, highlights critical barriers such as delays in implementation, inadequate maintenance, or misalignment with seasonal cycles. As past studies have documented, poorly maintained irrigation schemes often reduce water access precisely when it is needed most (Krüger et al., 2021; Yang et al., 2023). This aligns with Institutional Theory, which emphasizes how bureaucratic inefficiencies and weak accountability mechanisms reduce service effectiveness (Cvetković et al., 2021).

Similarly, subsidies, while politically popular and widely distributed, show only limited impact (r = 0.258; β = 0.186). This may be due to misallocation, delays, or the dominance of rent-seeking behavior, which has also been observed in Ghana's Fertilizer Subsidy Programme (Agyemang et al., 202). These issues highlight the importance of designing targeted, transparent, and time-sensitive delivery systems rather than expanding blanket subsidies without reform. Importantly, this study fills a methodological and contextual gap by comparing various services within the same statistical model, a departure from previous literature that tends to evaluate services in isolation. The high explanatory power of the regression model (R^2 = 0.966) supports the value of bundled interventions, aligning with emerging development frameworks that advocate for integrated policy approaches (Andrews et al., 2021). Yet, these findings must be interpreted with caution. Prioritizing extension services may inadvertently divert attention from longer-term infrastructure needs or reduce farmer autonomy if advice becomes overly prescriptive. Overdependence on government-led technical inputs could discourage local innovation or the use of indigenous knowledge systems. Therefore, a balanced strategy that enhances both external support and farmer-driven solutions is needed.

In a broader context, similar findings have been reported in Vietnam and the Philippines, where extension services significantly boosted rice productivity when embedded in locally relevant, trust-based systems (Gomina et al., 2024; Iyai et al., 2021). By integrating comparative regional evidence, this study strengthens its generalizability and policy relevance. From a theoretical perspective, the results support and extend public service effectiveness models, which posit that both service design and delivery mechanisms affect outcomes. Specifically, this study illustrates that effectiveness is not only a function of resource input but also of institutional trust,

E-ISSN: 2776-1290, P-ISSN: 2776-1282

adaptation to local conditions, and end-user experience elements often overlooked in top-down program evaluations. This study brings empirical insight into an area of research that is frequently dominated by programmatic studies that do not have the strength of being statistically rigorous. Though numerous policy reports state that agricultural interventions have been successful, only a minute number provides sound quantitative evaluation on a farmer level (Kebede et al., 2024). Our results indicate that the levels of extension services have the best influence on productivity with a regression coefficient of 0.814 and correlation coefficient of 0.966 with yield of agriculture. Not only does it confirm previous qualitative assertions but coats them in a quantitative dimension of substantiation. Additionally, the finding directly fills the research gap on Indonesia as many studies conducted about the country broadly generalized the role of extension services without an empirical stratification according to the type of extension service or impact level.

The comparatively lesser influence of training (0.070) and irrigation support (0.037) attracts attention to a discrepancy between a program design and the performance of implementation. Whereas the theoretical value of irrigation in boosting productivity has been established before (Yang et al., 2023), the current results indicate that the real-life application in the field might not be providing the desired results. It may be because of the late project implementation, infrastructure destruction or non-adjustment to seasons of farmers-what was mentioned in the works, these authors noticed that there is a very low efficiency of irrigation projects in some countries of Southeast Asia because of the bad maintenance of local people and their misuse (Krüger et al., 2021; Amin et al., 2022). Probably the most innovative input of the work is the fact that various services are compared against each other. This study also contrasts with the existing studies that commonly approach government interventions isolated in their own merits (subsidies only, training programs only, etc).

The comparative method gives a definite scale of efficiency, which forms an essential methodological gap, according to the literature (Snyder, 2001). Indicatively, subsidies are both politically popular and common in Indonesia but the study reveals that their effect on yield is relatively low (beta = 0.186; r = 0.258). This is in line with Asante & Mullard (2021) who warned that most of the time fertilizer subsidies are riddled with late payments and abuse. Also, the large value of R 2 0.966 in the regression model shows that the overall effect of government services explains a significant amount of variance in yield. This is the kind of explanatory power that very seldom is seen in social science research and supports the importance of a holistic and multi-service evaluation framework. It corresponds to the new views in development economics, which emphasize the importance of bundled interventions in solving the complicated and interconnected constraint in the agricultural systems (Andrews et al., 2021). Another area in which this study goes past other works is the localization of its analysis in a region thus covering another significant gap in the literature, which is lack of data on a certain region.

The majority of the farm support systems implemented in Indonesia evaluated before it is either national or have anecdotal character, and thus they may not serve as helpful guidelines when policymaking is carried out locally (Purnawan et al., 2021). In comparison, the stratified method we use in sampling our data makes the results both statistically sound and situation-specific making it more applicable in regional planning and budgeting. The paper has implications on the evidence-based policy making in agricultural development in general (El et al., 2023; Rosch et al., 2021). Due to the growing embrace of data-driven planning models by governments in developing nations, studies such as this provide a model that can be replicated in determining the actualized results of the delivery of public services. Based on the results, recommendations include giving priority to the growth and professionalization of extension services, incorporating digital innovation into the farmer outreach, reconsidering the timing of subsidies and irrigation programs, and making sure that the variations of available subsidies should continue to be based on the use of GMOs (Ricks et al., 2023).

E-ISSN: 2776-1290, P-ISSN: 2776-1282

CONCLUSION

In accordance with the results of the current research, it is possible to state that the work of government services contributes to achieving higher rates of agricultural production significantly, and among the latter, extension services are recognized as the most potent among them. The empirical outcome shown proves that even though the extension of all services, irrigation, training, and subsidies have positive nature in enhancing yield, extension services have the highest statistical influence. This is a reminder to those policymakers that more efforts towards strengthening agricultural extension system besides doing better training, accessibility methods, and association of resources have to be implemented. Moreover, the study can also fill an existing research gap because it conducts a comparative, data-driven analysis of service effectiveness, especially when done in the Indonesian context, where regional inequity and implementation issues still exist. The findings are also very instructive to policymakers to help re-prioritize the agricultural development policy with evidence-based focus to achieve a more focused and sustainable results.

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