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Strategy for Strengthening Research and Development Capacity in West Sumatra Province

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Abstract: The government places research and development (R & D) to take a significant role in implementing local government in an agency. However, there are still many regional research and development tools joined by the Regional Development Planning Agency (Bappeda). This research is qualitative research that aims to describe the conditions and problems of regional research and development joined by the Regional Development Planning Agency (Bappeda) and the strengthening strategy and role of regional research and development tools in planning dominance. Primary data were collected through online surveys and in-depth interviews and secondary data through the study of documentation and related statutory regulations. Data analysis was carried out descriptively. The results showed that the regional research and development under the Regional Development Planning Agency (Bappeda) still face internal and external obstacles. Their roles and functions are not optimal. This study recommends strategies for strengthening regional research and development and mechanisms for synergizing the roles of research, development, and planning.

Keywords: strategy, capacity, research and development

1. Introduction

The complexity of the development problem with all dynamics requires comprehensive, effective, and efficient handling. One of the efforts to answer this need was conducted through research and development. The results of R&D both in the form of concepts, models, and policy choices and innovation can ideally be used as input and recommendations for the formulation of public policies (Evidence-Based Policy) (Leni et al., 2019), (Oktaviana, Bachruddin, and Fernanto, 2018), (Sampurna and Irwandi, 2017), program evaluation (Labadjo, 2017), improving the performance of governance and development (Karnaeni, 2014), (Wahyuni and Aziza, 2017), (Saksono, 2019), innovation (Syekh, 2019) and increasing regional competitiveness (Gartika, 2017). However, the fact is that Research and Development Agency has not yet had optimal performance to answer these needs (Lakitan, 2012).

The Research and Development Agency is still facing internal and external obstacles that lead to the weak institutional capacity to play an optimal role. According to Labadjo (2017), classic problems such as human resources, budgets, development infrastructure, information technology, and leadership commitment are still internal problems faced by research and development agencies in general, in addition to external problems such as cooperation and utilization of research results. Another problem is related to governance and regulations that result in the underutilization of research results (Direktorat Penelitian dan Pengembangan Komisi Pemberantasan Korupsi, 2016).

Some of the results of previous research related to research and development emphasize the importance of capacity strengthening strategies as an effort to overcome problems faced by research and development agencies to improve organizational performance and to adapt to increasingly complex dynamics of change. Lakit (2012) emphasizes the importance of strengthening the capacity of all lines to achieve the goals of the R & D organization. Furthermore, Kause et al. (2018) (Karnaeni, 2014) argues that as a scientific organization, R&D needs to strengthen regulatory, human resources, and institutional capacity to achieve organizational goals.

The existence of Law Number 23 of 2014 is evidence of the government's seriousness in strengthening its research and development function in the form of an agency. Furthermore, Government Regulation Number 16 of 2017 and Permendagri Number 5 of 2017 regulates research and development institutions, both as independent institutions and those that join planning affairs. Furthermore, the regulation states that the lowest institutional form in the organizational structure of regional apparatuses joining the Regional Planning and Development Agency (Bappeda) is a sector level that has the same function. However, in practice, many local governments combine research and development agencies with planning at the echelon III level or the level of the field or in echelon IV at the level of sections or the Technical Implementation Unit (UPTB) (Oktaviana, Bachruddin, and Fernanto, 2018). This condition also generally occurs in district/city research and development agencies in West Sumatra Province, which consists of 1 independent research and development agency and 18 research and development agencies joining the Regional Planning and Development Agency (Bappeda).

Research related to strengthening the capacity of independent research and development agencies has been carried out by (Wahyuni and Aziza, 2017), (Gartika, 2017), (Karnaeni, 2014), (Susanto, 2014), (I. Putra and Iskandar, 2013), (Lakit, 2012). However, research related to research and development bodies that join the planning function to the best of researchers' knowledge has not been discussed much—likewise, research related to planning based on research and development.

Research (Oktaviana, Bachruddin, and Fernanto (2018) found that research and development agencies in Banten Province are not institutionally independent and are still attached to Bappeda in the form of fields (echelon III) with descriptions of main tasks and functions that are still not in accordance with the mandate of Minister of Home Affairs 5/2017. (Sampurna and Irwandi (2017). Meanwhile, the findings of

Saksono (2019) conclude that development planning in Southeast Sulawesi Province is still not based on research and development and innovation, so that it has not been able to accelerate the performance achievements of the implementation of regional development.

The two studies have not comprehensively reviewed other aspects that describe the conditions and problems of the research and development tools that have joined the Regional Planning and Development Agency (Bappeda). Therefore, this study discusses the institutional aspects, human resources, budget, supporting infrastructure, and outputs produced to describe the conditions and problems of the R & D equipment that joins the Regional Planning and Development Agency (Bappeda) in West Sumatra Province. This research is expected to produce a strategy to strengthen regional research and development, a synergy model of research, development, and planning to produce research and development-based planning to increase regional competitiveness.

2. Research Methods

This research method is a qualitative method with a descriptive approach and is supported by quantitative data collected as primary data. According to Moleong (2012), qualitative research intends to understand the phenomena in research subjects. The research results are in the form of observations of people or behavior, which are descriptive data in the form of written or spoken words. This research was directed to produce descriptive data in the form of conditions and problems of R & D equipment in 19 districts/cities in West Sumatra Province. This research was conducted for three months starting March s.d. June 2020. Types of data used include primary data and secondary data. Primary data collection techniques were conducted by in-depth interviews via telephone and distributing R&D profile forms via a google form. This technique was conducted with the consideration of the outbreak of the Covid-19 pandemic during the research process.

Questions related to regional research and development profiles related to institutions, human resources, budgets, facilities, and infrastructure and problems, while in-depth interviews were conducted to find out internal and external problems faced by regional research and development institutions, the strengths and weaknesses of regional research and development joining Regional Planning and Development Agency (Bappeda), synergy in implementing the main tasks and functions of regional research and development and planning as well as the choice of ideal institutions.

The research informants were determined purposively with the consideration that the informants came from structural officials representing echelon III (Head of Division) and echelon IV (Head of Section) and functional researchers who worked on regional research and development tools, who knew best about regional research and development problems, had worked or assigned in the area of research and development agency since formed approximately 3 years..

Tabel 1. Characteristics of Research Informants

Characteristics	Total (n)	Percentage (%)
Berdasarkan Jabatan		
Echelon III (Head of Division)	3	33,33
Echelon IV (Head of Sub Division) nomenclature	5	55,56
Functional Researcher (candidate)	1	11,11
Based on Gender		
Men	4	44,44
Women	5	55,56
Total	19	100

Furthermore, secondary data collection is in the form of documentation studies of statutory regulations, books, scientific papers, reports, documents, and secondary data sources relevant to and support research.

Data analysis was conducted through three stages, namely data reduction, data presentation, and conclusion or data verification. To test the validity of the data, it was carried out by using the triangulation technique of data sources and methods.

3. Results and Discussion

3.1. General Conditions of Regional Research and Development Apparatus

The general condition of regional research and development tools in research is viewed from institutions, human resources, budget. When viewed from the institutional structure, the regional research and development apparatus has a weak institutional structure and is not in accordance with Permendagri 5 of 2017. This condition is seen from most of the regional research and development apparatus that cannot regulate the name of research and development in its parent nomenclature. Meanwhile, the regional research and development apparatus attached to the Regional Planning and Development Agency (Bappeda) is dominated by sub-sectors (57.89%), and more than half of the regional research and development apparatus at the field level has two functions, namely the research and development planning function (see table 2). Meanwhile, Permendagri Number 5 of 2017 mandates the regional research and development apparatus that joins the Bappeda to be at the field level and carry out the same function. This condition places the regional research and development apparatus weak, especially in the policy-making process.

Tabel 2 . Institutional Conditions for Research and Development Apparatus in West Sumatra

Institutional	Number of districts / cities (N)	Percentage (%)
Nomenclature		
Research and development appears in the nomenclature	9	47,37
Research and development does not appear in the nomenclature	10	52,63
Position in Organizational Structure		
Agency	1	5,6
Sector*	7	36,84
Sub-sector	11	57,89
Total	19	100
Composition of Affairs		
Independent	1	5,26
Join with Regional Planning and Development Agency (Bappeda)	18	94,74
Pure Research and Development	7	36,84
Join the planning	11	57,89
- Dominant R&D	4	21,05
- Dominant planning	7	36,84
Total	19	100

* echelon III if the entire sub-sectors are research and development

** conformity with Permendagri Number 5 of 2017

Source: 2020 research results, data processed

Furthermore, from the human resource aspect, the composition of human resources for developing research and development apparatus in West Sumatra Province, both those joining Bappeda and independently, is still limited and does not yet have an ideal composition. In addition to the existing structural, the research and development apparatus that joined Bappeda was only assisted by 1 to 3 general functional people and did not have a functional researcher (Table 3).

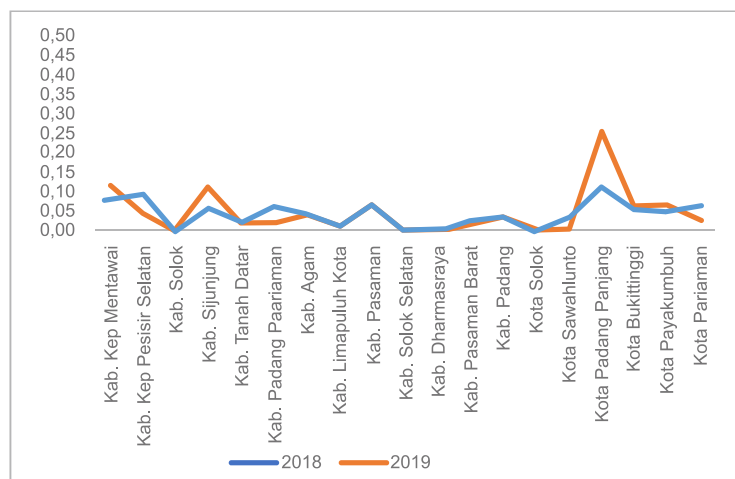
Table 3. Human Resources Condition of Research and Development Apparatus in West Sumatra Province

Regional Work Units of Research and Development	Total of Human Resources					
	Structural			Researcher Functional	General Functional	Total
	Echelon II	Echelon III	Echelon IV			
Independent (Agency)	1	3	8	2*	21	35
Joined (Sector)	0	1	3	0	3	7
Joined (Sub-sector)	0	1	1-2	0	1	3

Source: Survey Results, processed data, 2020

From the budget aspect, the source of the budget for development still comes from the Local Budget (APBD), with an amount less than 0.05% of the total APBD. The data cannot yet present the district/ city development budgets because the survey activities are still not integrated and spread across several Regional Work Units or planning fields in the Regional Planning and Development Agency (Bappeda). Figure 1 shows a significant increase in the weighting budget for research and development tools for the City of Padang Panjang. The increase in the budget is relevant to the amount of research carried out to support the vision and mission and regional development priority programs for the early leadership of the newly appointed mayor.

Figure 1. Percentage of district/ city R&D equipment development budgets to total local budgets (APBD) in 2018 and 2019,



Source: 2020 survey results, data processed

Based on the analysis of the conditions, it was concluded that there were still problems with the research and development apparatus joining the Regional Planning and Development Agency (Bappeda) in West Sumatra Province regarding institutional, human resources, and budgetary aspects. Therefore, it is necessary to strengthen so that the R&D apparatus has a strong institution and plays a more optimal role.

3.2. Problems of Strengthening the Role of Regional Research and Development Apparatus

3.2.1. Internal Problems

Internal problems are the findings of this study, namely human resources, budget, institutions, support/commitment, and infrastructure. These problems are classic problems that are also faced by the majority of research and development agencies in the regions, both independent and joined by Bappeda [Gartika \(2017\)](#), [\(Lakit, 2012\)](#), and [\(Santoso, 2010\)](#), [\(Kause et al., 2018\)](#). Figure 2 shows that human resource problems are still a major issue that needs attention.

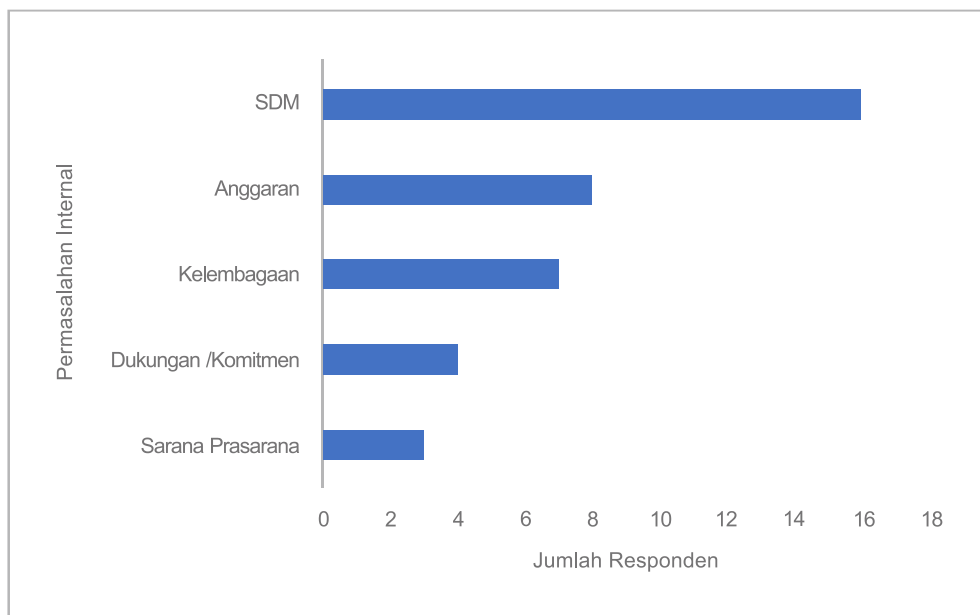


Figure 2. Problems with the Internal Apparatus Research and Development

Source: Survey Results, Processed data, 2020

In terms of quantity, as shown in Table 2, the research and development apparatus that joins Bappeda does not yet have a functional researcher as an actor for conducting research and development, as stated in Permendagri Number 16 of 2017. The composition of researchers and administrative personnel is still far from ideal. (Aswatini and Imron, 2010) Research and development organizations should ideally have a 1: 3 ratio of administrative staff to researchers. Meanwhile, from the aspect of quality, the level of education of human resources, the research and development apparatus is quite good. Still, the lack of technical training that has been followed has resulted in minimal technical knowledge to support the implementation of the main tasks and functions—in human resource problems, namely filling structural positions that have not paid attention to job competence (Susanto, 2014) and (I. R. A. S. Putra and Iskandar, 2013) and human resource development systems that are not yet comprehensive and are based on a comprehensive analysis of the integrity of education and training (Roga, 2019).

An internal problem that is no less important is the availability of research and development budgets. The research and development budget is a long-term investment (Lakit, 2012) which is important for increasing the productivity of regional research and development tools. However, the research and development budget is still minimal, and there are even research and development apparatuses that do not have a budget (see Figure 1).

The study results found that the minimum budget for the regional research and development apparatus was caused by 1. the unavailability of functional researchers; 2. there is a perception that research and development are not considered important; 3. The results of research and development have not been felt for the benefit of increasing the performance of regional development. 4. There has not been any collaboration between stakeholders related to research and development.

The following internal problem is related to institutional issues. It was combining research and development planning functions in one field impacts the role and function of the development carried out. Based on the interview results, it was concluded that the field-level regional research and development apparatus that combines two functions in one field is more involved in planning, even budgeting, compared to carrying out its main tasks and functions. However, this condition is also experienced by areas that purely carry out research and development functions.

The interviews with informants who came from structural officials from the regional research and development apparatus concluded that even though legally it had a main task and function of R & D. However, they must also be involved and

support the planning function. In addition, they also have to adapt their research and development activities to a reasonably tight planning schedule, especially if Bappeda is still implementing the budget domains such as the preparation of the General Budget Policy (KUA) and the Provisional Budget Priority and Ceiling (PPAS).

The existence of research and development in the Regional Planning and Development Agency (Bappeda) is an advantage to support planning and facilitate research and development results through the planning process. However, the absence of a synergy mechanism between the two functions has resulted in the R&D function joining the Regional Planning and Development Agency (Bappeda) under planning domination.

Another institutional problem that is no less important is supporting institutions for R&D such as the Regional Research Council (Presidential Decree Number 16 of 2005), the Advisory Council, and the Quality Control Team (Permendagri Number 16 of 2017). The existence of these institutions is important in providing policy direction, input, and suggestions as well as R&D considerations. However, there are still 14 regions (73.68%) that do not yet have Regional Research Councils (DRD), and 13 regions or 68% have not yet compiled a Research and Development Master Plan (RIK) as a guideline. For carrying out R&D activities.

Internal support/commitment, both from the leadership of the regional head and related structural officials, is needed to optimize the role of the research and development apparatus. The results of this study found that the support/commitment was not optimal due to the following factors:

- a. do not understand the importance of the role and function of research and development
- b. research and development output has not been seen
- c. limited human resources, especially there are no functional researchers
- d. more focused on planning matters
- e. the weak position of R & D apparatus in the Bappeda Organizational Structure and Work Procedure (SOTK)
- f. structural research and development officer competency issues

Based on interviews, the quality of R&D results has not been optimal. The results of R & D are not yet operational; the results are not immediately felt. They are not yet relevant to development problems and the needs of Regional Work Units. According to [Surminah \(2013\)](#), there is no meeting point between the results of research and development and its users, so it is not optimal. In the context of combining the regional research and development apparatus at Bappeda, according to ([Oktaviana, Bachruddin, and Fernanto, 2018](#)) and ([Gartika 2017](#)), research activities carried out by the regional research and development apparatus have not been able to answer regional problems so that the results of research and development have not been used guidelines in the formulation of policies and planning documents. Furthermore, [Leni et al. \(2019\)](#) add problems related to other research and development results, namely the lack of dissemination of research and reports that are not understood by policy practitioners resulting in the use of research and development results less relevant to development problems.

Regional Work Units and related stakeholders should utilize the results of R & D to support the performance of regional development implementation. Therefore, communication, coordination, and cooperation between research and development institutions and their users should be established to meet demand/needs and research offerings at one point and be maximally utilized.

The position of the research and development apparatus joining Bappeda should be very strategic to realize this condition. The implementation of R & D results can be entered through the planning process of the implementing Regional Work Units and is supported by the Bappeda fields to facilitate the budgeting process. However, in reality, research and development and planning are still not synergistic and are running independently. These internal problems require a strategy of strengthening internal capacity to improve the role and function of the research and development apparatus

3.2.2. External Problems

The wrong perception of the role and function of research and development is one of the external obstacles in strengthening the capacity of the research and development apparatus. This obstacle is also the finding of [Santoso \(2018\)](#). The results showed that the implementation of research that was not yet one door opened opportunities for Regional Work Units (SKPD) and other fields at Bappeda to carry out research and development activities. This condition certainly minimizes the role of the R & D apparatus in the eyes of Regional Work Units (SKPD). The same thing is also found from the research results ([Sampurna and Irwandi, 2017](#)); namely, 95% of the Regional Work Units consider that independent R&D is not important. The limitations possessed by the research and development apparatus in terms of human resources and budget cause the function of the research and development apparatus to recapitulate research results more. In fact, to overcome human resources and budget problems, the research and development apparatus can collaborate with various stakeholders to carry out research and development activities, both government, private, and university research and development institutions.

The existence of a misperception of the role and function of R&D can lead to sectoral egos that affect the support of the Regional Work Units (SKPD) for follow-up on the results of research recommended by the R&D apparatus. This sectoral ego can hinder collaboration, coordination, and cooperation to improve the quality and utilization of R&D output. However, a collaboration between science and technology developers and their users is not yet entrenched ([Lakit, 2012](#)).

3.3. Strategy for Strengthening the Capacity of the Regional Research and Development Apparatus

3.3.1. Internal Capacity Strengthening Strategy

Human resource capacity affects organizational performance ([Huang and Huang, 2020](#)). Therefore, the first strategy undertaken is to improve the quality and quantity of human resources of the research and development apparatus. Increasing human resources is carried out by submitting proposals for additional employees and functional researchers to the Personnel and Human Resources Agency (BKPSDM). Fulfilling the functional needs of researchers can be done through the appointment of Civil Servant Candidates (CPNS), transfer from other positions (in passing), or functional mutations of researchers from other institutions.

Improving the quality of human resources can be done through formal education, training, education, and training, technical guidance, seminars, and mentoring, which are expected to increase knowledge, insight, skills, expertise, and work behavior ([Saimroh, 2017](#)). Another effort taken to overcome the limitations of human resources, especially the absence of functional researchers, is to collaborate with universities or other R&D institutions in conducting research and development. In addition, strengthening the capacity of human resources cannot be separated from the role of solid bureaucratic leaders to provide role models and change the work culture for better research and development ([Parjaman, Soedarmo, and Enas, 2019](#)).

The second strategy is to increase the capacity of research and development institutions through evaluation of primary duties and functions and restructuring of regional development agencies. Regional research and development apparatuses that are not following their primary responsibilities and functions with Permendagri Number 5 of 2017 need to be evaluated and adjusted to these regulations through institutional restructuring. The institutional restructuring is expected to create government organizations that are effective, efficient, and productive and have high performance (Ruhara, 2000), ([Asaloei, 2014](#)).

Based on interviews with informants, there are two options for the organizational restructuring of R&D instruments: becoming an independent research and development institution or remaining in the Regional Development Planning Agency. The regional research and development apparatus that joins the Regional Development Planning

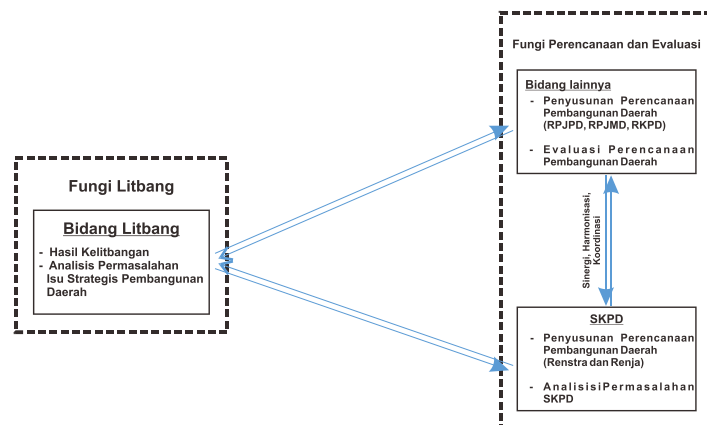
Agency must be at the field level, which carries out the main tasks and functions of research and development as mandated in the Minister of Home Affairs Regulation Number 5 of 2017.

Through institutional restructuring, it is hoped that the regional research and development apparatus will have the power to carry out research and development activities and synergize with planning matters. To realize the synergy of research and development and planning, a clear and firm Standard Operational Procedure (SOP) should be prepared and a clear and firm work mechanism both internally and externally which is strengthened by the stipulation of regulations so that research and development and planning affairs can synergize with each other and do not overlap and dominate other affairs. In addition, strengthening the role of research and development supporting institutions such as the Advisory Council, Quality Control Team is necessary to improve the quality of the output of research and development and innovation results. Furthermore, supporting facilities and infrastructure based on Information Technology also needs to be equipped to adapt to global changes.

The third strategy, namely increasing support/commitment. The support and commitment that is expected not only comes from the leadership or policymakers but also comes from the Regional Work Units (SKPD) and other parties and the community as the target object of research and development results. Support by higher research and development institutions such as the provincial Balitbang and the Ministry of Home Affairs Research and Development Agency will coordinate, synchronize research and development activities, and coach regional research and development apparatuses. This support can strengthen budgets, institutions, human resources, infrastructure, and other supporting resources. Budget support is expected to increase the research and development budget by at least 1% of the local budget (APBD). Support from the institution’s leadership is carried out through institutional restructuring and the main tasks and functions of the regional research and development apparatus.

The fourth strategy is to improve the quality of research results. Improving the quality of research needs to be carried out through several techniques such as strengthening internal capacity, research carried out based on the needs of research and development users, and strategic issues or regional development problems. Besides, quality research results need to be disseminated to encourage collaboration in using these research results. In this case, to support the use of research and development results, it is necessary to strengthen Information Technology. In the context of a regional research and development apparatus that joins Bappeda, improving the quality of research and development can be done through synergy with planning. According to (Saksono 2019), the synergy of research and development can encourage multi-stakeholder collaboration. Utilization of research and development results within the local government through planning synergy can be carried out as shown in Figure 3.

Figure 3. The synergy of Research and Development, Planning and Evaluation



Description: RPJPD: Long-term Regional Development Plan | RPJMD: Medium-term Regional Development Plan | RKPDP: Local Government Work Plan | Renja: Work Plan Renstra: Strategic Plan

Research and development support for planning can be done in two ways, first through the planning formulation process, second through the monitoring and evaluation of development planning. The formulation of regional apparatus planning (Renstra and Renja) as well as regional development planning (RPJPD, RPJMD, RKPD), regional research and development apparatus can provide input on policy / regulatory / program recommendations based on the results of research and development as well as the results of analysis of problems and strategic issues of regional development through the technocratic approach.

Furthermore, the results of the evaluation of regional development planning documents carried out by the fields of the Regional Development Planning Agency as well as the results of an evaluation of regional apparatus planning documents by Regional Work Units in the form of problems and strategic issues for regional development can be used as material for analysis of issues and strategic issues for regional development as well as plans further research and development. Besides, regional research and development agencies also evaluate development policies (implementation of policies, regulations, and development programs). The output is in policy suggestions/policy recommendations, both for RPJMD, RKPD, and Renstra, Renja OPD. The analysis of problems and strategic issues for regional development are input recommendations for planning documents carried out by the Bappeda and SKPD sectors. It is hoped that this reciprocal relationship can create synergy between the R&D and planning functions within Bappeda (see Figure 2).

3.3.2. External Capacity Strengthening Strategy

The strategy of strengthening external capacity is carried out by conducting more effective outreach to policymakers and related stakeholders to unify perceptions regarding the importance of the role and position of research and development, then build and expand networks of mutually beneficial research and development coordination and collaboration with tertiary institutions, third parties / private and public through the use of research and development results (Syekh, 2019). Collaboration carried out is related to research collaboration, cooperation in the use of research and development infrastructure, and dissemination and implementation of research and development results.

Strengthening the network/cooperation that is developed is mutually beneficial cooperation between the two parties. The results of this collaboration are expected to be truly used for the benefit of regional development and improvement of community welfare. To enable collaboration in terms of utilizing research results, according to (Lakit, 2012), the strategic plan should be adjusted with the vision and mission, as well as development goals and objectives to produce science and technology that is following real needs (Saimroh, 2017). In addition to strengthening external networks, strengthening internal networks is necessary to optimize research results. Internal network strengthening is carried out with Regional Work Units within the district/city government to coordinate activity and innovation activities. For example, coordination related to R&D needs and implementation of research recommendations, and coordination of SKPD innovations (Ratnasari, Makmur and Ribawanto, 2013).

4. Conclusion

This study concluded that the condition of the regional research and development apparatus that joined Bappeda in West Sumatra Province both internally and externally was still not optimal. This study found that there were no functional researchers as a driving force for research and development activities in the regions, the research and development budget was still minimal, the limited supporting facilities and infrastructure and institutionally, the regional research and development apparatus that joined the Regional Development Planning Agency still had a bargaining position weak. This condition impacts the implementation of the main tasks and functions that are more dominated by planning tasks than research and development.

This study found that there has not been a synergistic and mutually beneficial relationship between the planning affairs carried out by the Regional Development Planning Agency and the research and development affairs carried out by the regional research and development apparatus joining the Regional Development Planning Agency. The form of synergistic relationship in question is research and development support for the planning function in the form of input recommendations from the results of research and development as well as the results of analysis of strategic issues through a technocratic approach, on the other hand, planning support for research and development functions is in the form of evaluation results of regional development planning documents and regional apparatus. To ensure this synergy, it is necessary to formulate Standard Operating Procedures for synergy of research and development, planning, and evaluation.

Based on the problem conditions of the research and development apparatus in the area, this study recommends several strategies that can be carried out to strengthen research and development institutions in the district/city, namely:

1. Increase the capacity of research and development institutions through evaluation of the main tasks and functions and restructuring of regional research and development institutions as mandated by the Government Number 16 of 2017 and Permendagri Number 5 of 2017 that the regional research and development apparatus that joins the Regional Development Planning Agency is at the field level and perform the same function
2. Increase the capacity of human resources in quantity and quality. The regional research and development apparatus can propose the needs of employees, especially functional researchers, either through employee formation, transfer of position, or in passing. Improving the quality of human resources of the apparatus can be done by submitting the need for training / technical guidance to BKPSDM or through budgeting capacity building in the regional research and development apparatus and research collaboration and resource sharing.
3. Increase leadership support/commitment to budgets and institutions through strengthening regulations that support research and development
4. Build and expand mutually beneficial research and collaborative development networks with universities, third parties / private sector, and the community. Collaboration networks are limited to research and development activities and collaborative writing, laboratory utilization, journal management assistance, and increasing the human resource capacity of the research and development apparatus.
5. Increase the dissemination and publication of research results through the publication of journals, books, seminars, mass media, websites, and other forms
6. Strengthening the use of information technology in managing data and research results, expanding access to scientific information sources (sourcing capacity), publications, and others

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