Agile Method in Developing Electronic Local Government Food Reserve Distribution Services (E-CPPD) in Sukabumi City

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Abstract

Indonesia is a country with a region that has disasters here. As a Regional Apparatus Organization which must distribute regional government food reserves to the community when natural disasters strike, Dinas Ketahanan Pangan, Peternakan dan Perikanan Kota Sukabumi took the initiative to develop an application that can speed up the distribution of aid to the community. This national food reserve policy can support national defense in emergency conditions. The hope is that the development of this application can speed up the administration of official correspondence, where the administration of this correspondence is an element that slows down actions in almost every department, resulting in the length of time that citizens receive assistance. There are many discussions and interviews with various users who need to adapt an environment that requires flexibility in changes to system development, so this system development uses the spiral method. As a result, based on the user requirement list, 100% of user needs can be completed on time. The result, almost nine (9) tons of rice have been distributed to residents spread across 22 of the 33 sub-districts in Sukabumi City.

Keywords: CPPD, eCPPD, Spiral, Application, Sukabumi, EGov, DKP3

1. Introduction

The industrial revolution 4.0 that is currently sweeping the world has been underway for more than 10th years ago. It is a very massive change towards using Information Technology (IT) more quickly, including the government during Covid-19. The Local governments also seem to be competing to innovate, especially in the IT sector, where various application have been created to make work easier and faster for each agency to completely the task [20].

This condition is reinforced by the Instruction of the President of the Republic of Indonesia Number 3 of 2003 concerning National Policy and Strategy for E-Government Development which explains that E-Government is an effort to utilize information and communication technology which is intended to increase efficiency, effectiveness, transparency and accountability in government administration and services. public [1]. Through the development of e-government, management systems and work processes in the government environment are structured by optimizing the use of information technology. The use of information technology includes 2 (two) related activities, namely (1) data processing, information management, management systems and electronic work processes; (2) utilizing

advances in information technology so that public services can be accessed easily and cheaply by people in all regions of the country.

As an agency that has a need for distributing regional government food reserves (CPPD) to the community when natural disasters strike, the Sukabumi City Food Security, Livestock and Fisheries Service (DKP3) took the initiative to develop an application that can speed up the distribution of aid to the community. This national food reserve policy can support national defense in emergency conditions [2].

In order to realize the success, smoothness and orderliness of CPPD implementation, the Sukabumi City Government has issued a legal Local Regulation Number 8 of 2019 concerning Food Management [23]. That the distribution of CPPD is carried out in order to help the main food actors who experience crop failure due to the impact of climate change and other causes, to help communities affected by natural disasters, social disasters and/or emergencies; helping people who experience food insecurity; and/or maintaining price stability and food supply [3]. Then it was strengthened by enacting Sukabumi Mayor Regulation Number 83 of 2021 concerning the Implementation of Sukabumi City CPPD, which so far has not implemented an Electronic-Based Government System (SPBE/E-Gov) optimally [4].

Based on Sukabumi Mayor's Regulation Number 83/2021 in Article 8, there is a team involved in implementing CPPD whose task is to identify verification of target locations, recipient households, both sub-district proposals and Mayor's orders. In terms of recommendations for determining the target location, house target date, and the number of CPPD distributed are the responsibility of DKP3 Sukabumi City [22]. After determining the target, the sub-district party carries out the distribution of CPPD to houses on the specified date [29]. Finally, the Sukabumi City DKP3 prepared a report on the implementation of CPPD distribution to the Mayor [21]. For the amount of CPPD assistance in the form of rice distributed based on Article 16, it is explained that each person per day receives 300g (0.3 Kg) of rice with a maximum duration of 60 days and/or according to the results of the team's investigation at the disaster location. Meanwhile, rice assistance to control fluctuations in staple food prices is a maximum of five (5) kg per family.

The implementation of Sukabumi City CPPD services still applies work systems and processes that are based on a fairly long and rigid bureaucratic order based on Sukabumi Mayor Regulation Number 83/2021 above and is difficult to respond to changes in the increasingly complex and dynamic urban environment, and needs to be responded to quickly and accurate. To meet the community's needs regarding CPPD assistance, a modern management system based on information technology with a networked organization must be developed so that it can shorten decision-making lines and expand the span of control [27].

In connection with the matters referred to above and considering that in the future there will be more and more incidents in the community in the form of disasters or other emergency conditions that are difficult to predict and have the potential to cause food insecurity as well as increasing public demands for improving the quality of public services in food matters, especially Regarding the distribution of CPPD aid, it is considered very urgent and very important to develop a CPPD application for Sukabumi City [28].

The development of the CPPD application into an Electronic-CPPD (e-CPPD) is expected to have a positive impact in being able to simplify the process and speed up CPPD submissions, maximize document security, speed up the paperless CPPD administration process, increase the accuracy of targeting CPPD aid recipients, speed up reporting and be able to support the realization good government and good corporate governance within the Sukabumi City Government [24]. With e-CPPD, sub-districts can more quickly try to help their residents who are affected by disasters and have the potential to experience food insecurity to obtain CPPD assistance either from the CPPD of the Sukabumi City Government or from the CPPD of the West Java Provincial Government in accordance with applicable regulations. Moreover, in Law of the Republic of Indonesia Number 18 of 2012 concerning Food, Article 30 has mandated the Government and Regional Governments to organize the procurement, management and distribution of Government Food Reserves [25]. Furthermore, Article 114 explains that the Government and Regional Governments are obliged to build, compile and develop an integrated Food Information system [5].

Application-based government services at the agency level are now commonplace. Such as the role of the Government Resources Management System in the state financial accounting cycle (case study of the Central Java regional road management center) which involves a number of services such as e-project, e-budgeting, e-procurement, e-controlling, e-delivery, and e-performance [6], public services

through e-government use the Sianton application at BPN Pekanbaru City to produce an online queuing system [7].

To complete application development requires a system development method that is appropriate to conditions in the field and meets user needs as outlined in the user requirements list (URL). One method that is adaptable and flexible to changes in all forms in software development is the spiral method [30]. This spiral method is used because considering that there is no standardization of form, application appearance, and many system requirements based on the CPPD regulations above must be discussed iteratively in a minimal amount of time. To assess the software success of this CPPD service requires relevant testing. Like black box testing which tests the functionality of software requirements by providing input and seeing the output as expected or not [8]. Apart from testing, an application assessment also needs to be carried out. One method for assessing applications uses functional aspect assessment using Feature Completeness assessment [9]. This assessment is very suitable for use by users in government environments, such as in the development of the Covid-19 information system in Sukabumi City [9].

2. Research Method

Application development specifically uses modeling, workflow, techniques and supporting tools to solve existing problems.

2.2. Model

To develop an information system requires a model that suits the conditions of the users, namely the Mayor of Sukabumi, DKP3, and all existing sub-districts. The requested application must be published immediately, dynamic in data changes, flexible in data input, able to minimize work risks, and easy to maintain if further development is needed and errors occur. One model that suits these conditions is the spiral model [12]. The advantage of the spiral model is that the stages of this model are simple, easy for laymen to understand, and most importantly iterative in nature where web application developers can return to previous phases. When an error is found and make corrections to the error. The general description of the spiral model can be seen in Figure 1 below [10].
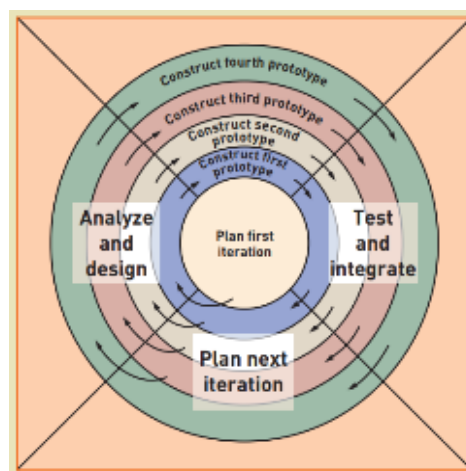

Figure 1. *Model Spiral*

In the spiral model, the design work and implementation of the program code which results in prototyping are in the same stage. The design and prototyping stages in the process become the driving force for the completion of the information system being worked on.

2.2. Supporting Devices

In system development requires tools such as,
1. Hardware A set of computers with a 1Ghz Processor
2. Software StarUML, CodeIgniter 3, Adminer, Morris Chart.
3. Hosting and Domain Created through the Sukabumi City Communication and Information Service with the domain name https://ecppd.sukabumikota.go.id.

2.3. Time and Place of Implementation

The time for conducting the research was from March to July 2022 at the Sukabumi City Food Security, Livestock and Fisheries Service (DKP3) office.

2.4. Technique

In collecting information about detailed system requirements, several techniques need to be implemented, including interviews with users or other stakeholders, review of input, output and documentation, and also literature studies to complete the URL [13]. The following is a list of URLs based on the results of information collection with users which can be seen in Table 1 below.

Tabel 1. User Requirement List (URL)

No	List of needs	User
1	Graphics and information on the availability and distribution of Sukabumi City CPPD on the front page.	
2	Dashboard of the number of requests that have been made and the progress of submissions at the sub-district level	Village Admin
3	Application menu	Village Admin
4	Help Receipt Menu	Village Admin
5	Subdistrict Admin Profile	Village Admin
6	There is a dashboard of the number of requests that have been made and the progress of submissions at the sub-district level in the sub-district	Subdistrict Admin
7	Dashboard of the number of requests that have been made and the progress of submissions in all sub-districts of Sukabumi City	Mayor
8	Dashboard of the number of requests that have been made and the progress of submissions in all sub-districts of Sukabumi City	Administration Officer
9	Manage app users	Administration Officer
10	Dashboard of the number of requests that have been made and the progress of submissions in all sub-districts of Sukabumi City	Head Officer
11	Application List	Head Officer
12	Goal Setting List	Head Officer
13	Handover List	Head Officer
14	Application List Completed	Head Officer
15	Manage User Profiles	Head Officer

1. Evaluation

   Functional aspect assessment uses Feature Completeness assessment with the following formula:

$$X = \frac{i}{P} \tag{1}$$

   Note :
   P = Number of features / menus designed
   i = Number of features successfully implemented

2. Workflow

   The workflow of the system to be built must conform to Sukabumi Mayor Regulation Number 83/2021 above [14]. The following is the workflow of the system that will be digitized based on Sukabumi Mayor Regulation Number 83/2021 which can be seen in Figure 2 below.
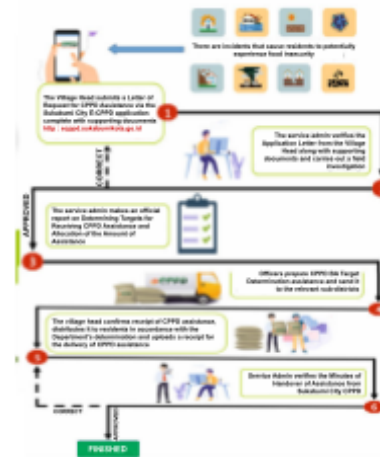
Figure 2. CPPD System Work Flow Based on Sukabumi Mayor Regulation No 83/2021

Based on Figure 2. Above, there are several types of users who play roles as users at the sub-district level (sub-district admin), users at the service level (department admin), users as monitors of requests for assistance such as the Head of the DKP3 Service, the District Head, and the Mayor [15]. To assist in system design and modeling, this software uses the Unified Modeling Language (UML) which implements use case diagrams [16]. This diagram outlines the interaction that occurs between the user and the system/application. The following is a use case diagram for the Sukabumi City CPPD service which can be seen in Figure 3 below.

Figure 3. CPPD Service Diagram Use Case

3. Results and Analysis

Application development guidelines are adjusted based on Table 1. The URL above is translated into use cases and implemented in programming form. The programming that we compile combines various other sharing tools [19]. The database was built using Mysql in the Adminer Database management application [17]. The front page contains graphics, descriptions and information on the availability and distribution of Sukabumi City CPPD on the front page. The following is a view of the front page which can be seen in Figure 4 below and can be accessed via the site https://ecppd.sukabumikota.go.id/.

Figure 4. Landing Page e-CPPD

3.1. Village Admin (Village Head)

Based on the use case and workflow above, the Subdistrict Admin consists of two menus, namely Applications, Receipts, and a Dashboard which shows information on the number of requests that have been made along with the progress of submitting applications [18]. The following displays the menus in the Subdistrict Admin which can be seen in Figure 5 below.
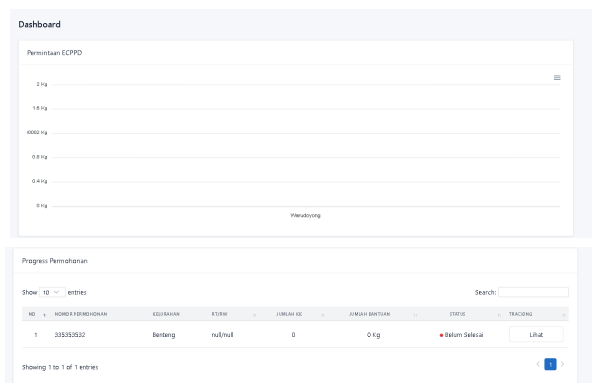

Figure 5. Dashboard Page for Subdistrict Admin (Village Head) Users

In the application process as shown in the use case above, via the Application menu, there is a series of processes for submitting a new application consisting of (a) identity of the application letter, (b) attachment to the application in the form of resident identity which must include family card and photo of those affected by the disaster, (c) attachment proof of request in the form of disaster photos [26], (d) incident reports originating from Sukabumi City BPBD, and (e) Automation of aid request documents which have become PDF files. The detailed display of the Application menu is presented in Figure 6 below.

(a)   Identity of the application letter

(b)   Attachment to the application
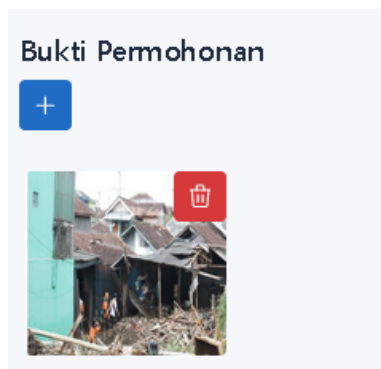
(c)   Attachment to proof of application

(d)   Incident report

(e)   Automation of application submission documents along with attached evidence into PDF files
Figure 6. Display of the process for submitting a new application

In the Receipt menu, it is a condition where the request for assistance submitted is accepted and will be sent after the target determination has been decided. In the target setting process, DKP3 calculates the number of members in the KK proposed in the attachment multiplied by 0.3 kg in accordance with Sukabumi Mayor Regulation Number 83/2021 in Article 8 which has been explained above. The following displays the Receipt Menu which can be seen in Figure 7 below. In the Receipt menu, there are statuses "Aid Not Yet Received", and "Already Received". This status is the result of input by the

Subdistrict Admin which is automated when uploading receipt data and the recipient's signature has been carried out by the aid recipient.
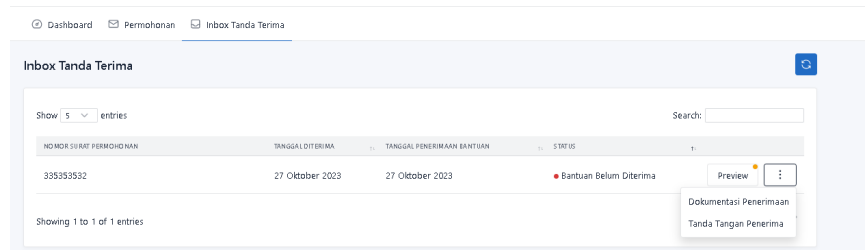

Figure 7. Receipt Menu Display

3.2 District Admin

The menu display in the sub-district admin only shows a dashboard in the form of tabulated data and graphs of the number of applications (in Kg) that have been determined to be distributed and the progress of applications from each sub-district in the sub-district. The display on the dashboard in the Sub District Admin can be seen in Figure 8 below.
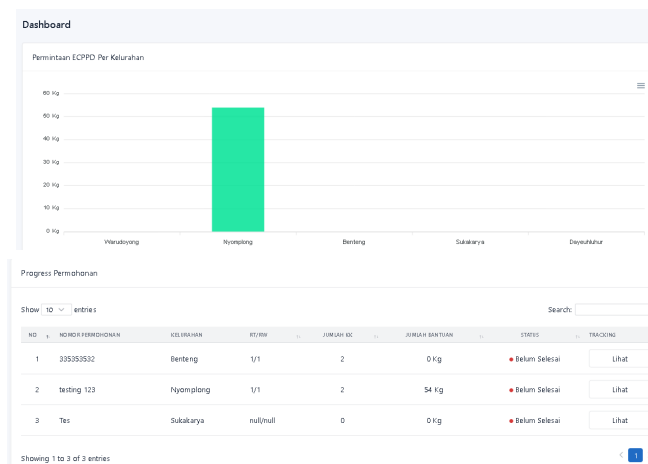

Figure 8. Display of the Dashboard Menu on the Subdistrict Admin Account

3.3 Service Admin (DKP3)

In the Service Admin account there is a dashboard containing the progress of the application which can be tracked to see how far the CPPD assistance application has progressed which can be seen in Figure 9 below. The Accept Applications menu is a menu that shows requests from all sub-districts in Sukabumi City. Every application received is always checked for completeness of the attachments. The application will be approved when all attached files comply with the provisions, and otherwise will be returned for correction. The Application Menu display can be seen in Figure 10 below.
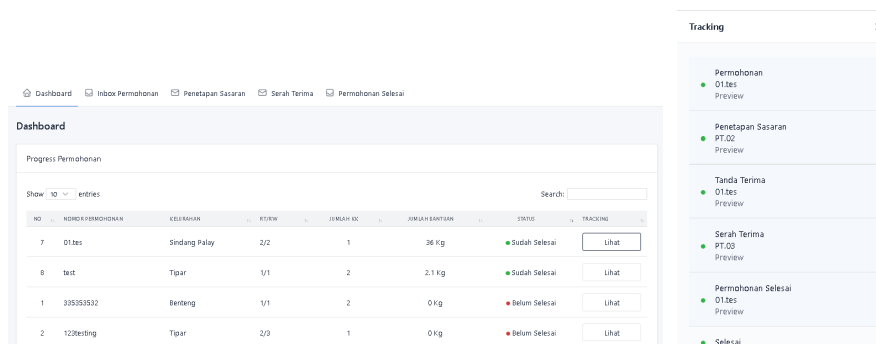

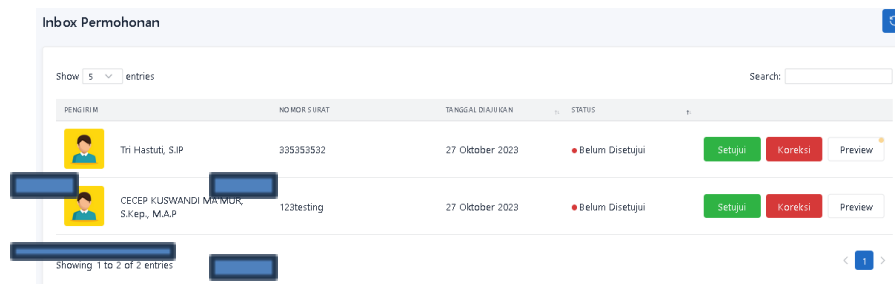Figure 9. Dashboard Menu Display on Service Admin Account

Figure 10. Application Menu Display on Service Admin Account

Furthermore, the Target Setting Menu contains a number of requests that have been previously approved in the Applications menu. In this menu, the department calculates the number of Kg that corresponds to the family members in the KK contained in the attached attachment in accordance with Sukabumi Mayor Regulation Number 83/2021 in Article 8, namely the number of KK members x 0.3 Kg x duration of assistance (days). The following displays the Target Setting Menu which can be seen in Figure 11 below.

Figure 11. Display of the Goal Setting Menu on the Service Admin Account

The Handover Menu shows the data that will be handed over CPPD assistance from the service by the Head of the Service and handed over to the applicant (sub-district). The Confirm button is a symbol that the assistance has actually been received by the sub-district and will be immediately distributed to the affected residents. The following is a display of the Handover menu which can be seen in Figure 12 below.
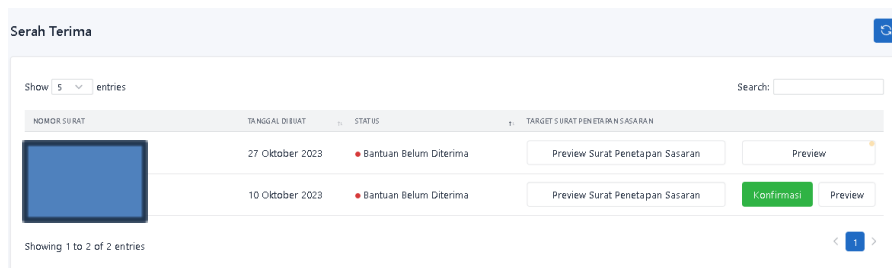

Figure 12. Display of the Handover Menu on the Service Admin Account

Finally, the Completed Application Menu shows that the entire application process has been completed, both from the sub-district side and from the official side. So in this menu there is only documentation from the initial stage of the sub-district sending the request, documentation of the service setting targets, documentation of the handover of aid from the service to the sub-district, until the request is completed by attaching proof of delivery of aid to the community using photos and signatures of affected residents. The following is a display of the Completed application menu which can be seen in Figure 13 below.
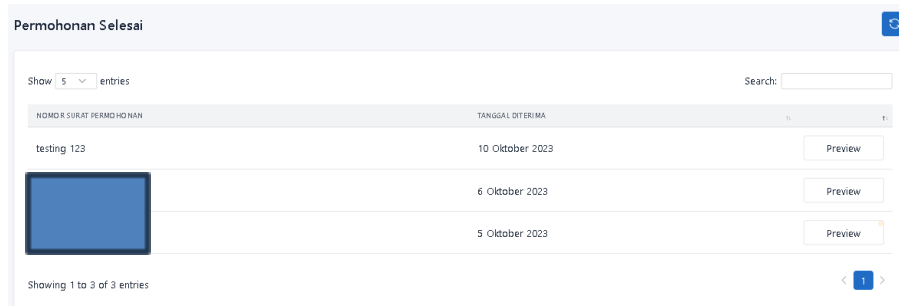
Figure 13. Display of the Application Completed Menu in the Service Admin Account

3.4. Mayor

In the Mayor's account there is only a dashboard menu that shows the progress of CPPD assistance applications for all sub-districts of Sukabumi City. This menu display is the same as Figure 9 above.

3.5. User Profile

This user profile menu is only available on Service accounts which displays all designated users and is related to the CPPD process. The following is the Manage user profile display which can be seen in Figure 14 below.
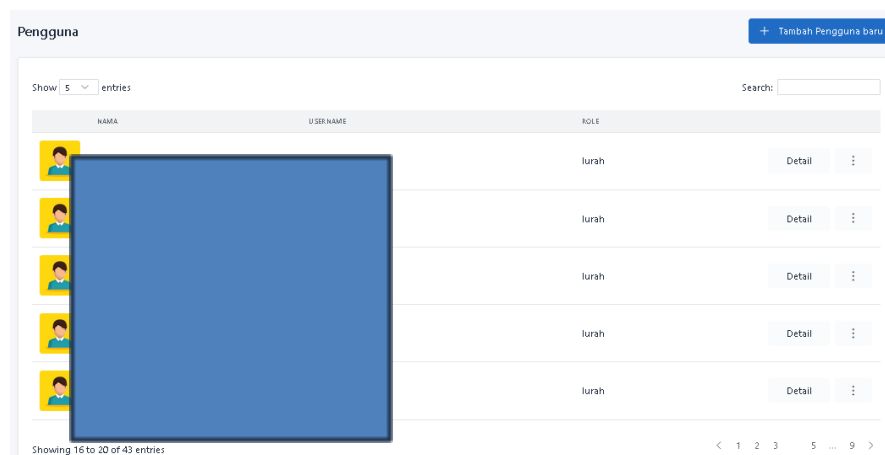

Figure 14. Display of the Manage User Profile Menu on the Service Admin Account

3.7. Evaluation

The e-CPPD application assessment is a Feature Completeness assessment using formula (1) along with the calculations:

$$X = \frac{i}{P} \tag{1}$$

$$X = \frac{15}{15} = 1$$

Note :
P = Number of features / menus designed
i = Number of features successfully implemented

The results of the Feature Completeness assessment with a value of 1 indicate that all requirements based on the URL have been successfully completed as required. Apart from the results of this assessment, the application developed has also distributed rice aid reaching 5,238 Kg in the month before October and 3,613.5 Kg in October 2023 which can be seen in Figure 4 above. This shows the level of usability of this application is really needed. Figure 4 above also shows that there are 11 out of 33 sub-districts that have not yet submitted an application. It can be assumed that in these 11 sub-districts

there has not been a disaster in the food sector. However, this assumption does not mean that the sub-district must experience a food disaster.

4. Conclusion

Based on the results of the discussion above, as many as 15 features required by users have been successfully developed using the spiral method. Using this method was successful in helping to solve the problems that existed in DKP3 Sukabumi City. The results of the Feature Completeness assessment with a value of 1 (100%) indicate that the matter in question has been successfully resolved. That way, this application can be used well by users such as Village Admins, Service Admins, District Admins, and Mayors. This is proven by the distribution of up to 8,851.5 Kg (< 9 tons) to residents of Sukabumi City who were hit by a food disaster due to various reasons in accordance with Sukabumi City Regional Regulation Number 8 of 2019 and Sukabumi Mayor Regulation Number 83 of 2021 concerning the Implementation of Sukabumi City CPPD.

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