

A CRITICAL REVIEW OF AGRICULTURAL RELATED CONSTRUCTION PROJECT FAILURES AT THE DEPARTMENT OF AGRICULTURAL, RURAL DEVELOPMENT AND ENVIRONMENTAL AFFAIRS (DARDLEA): MPUMALANGA

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ABSTRACT

The aim of the study was to determine the causes of construction project failures in the Department of Agriculture, Rural Development and Environmental Affairs (DARDLEA). A detailed literature review was carried out on construction projects that failed due to cost and time overruns. A list of construction project failure factors was identified and later categorised into contractor, client and owner-related causes. A five-point Likert scale was used to collect data from the contractors and owners and the same questionnaire was used to interview the clients or beneficiaries telephonically. The data were analysed using the Relative Importance Index (RII) and Correlation Testing. The key causes of construction project failure as per their rankings were poor communication, lack of monitoring and evaluation, lack of client or beneficiary involvement, lack of project planning, financial difficulties, poor project scheduling, incomplete project drawing, conflict, poor technical performance, and changing client requirements. The Spearman correlation concluded that relationships existed amongst the owner, client and contractor responses. From the results, the main recommendation is that all project planning, design and scheduling should be approved by the contractor, client and owner before construction commences. Secondly, all project stakeholders should be involved during the planning of projects to enhance project sustainability, and thirdly, projects should only commence when there is a guarantee that all plans, budgets and schedules are realistic, and funds are available for access. With regards to extension, the results indicate specific areas of stakeholder engagement prior and during construction to assist in managing expectations.

Keywords: Project failure, construction projects, time overruns, cost-overruns, project schedule

1. INTRODUCTION

The Mpumalanga Department of Agriculture Rural Development and Environmental Affairs (DARDLEA) was established in terms of section 197 of the Constitution and read with section 7 (1) and 7 (2) of the Public Services Act of 1994. The Department derives its core mandate from the provisions of schedules 4 and 5 of the Constitution of the Republic of South Africa and in accordance with section 104 (1) (b) of the Constitution (Mpumalanga Provincial Government, 2012).

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The mandate of the National Department of Agriculture is the understanding of agriculture, as being inclusive of all economic activities from the provision of farming inputs, farming and value-adding (Department of Agriculture, Forestry and Fisheries, 2005/2006. Department of Agricultural, Rural Development and Environmental Affairs (DARDLEA) is involved in the construction of value adding infrastructure projects for farmers in the different municipalities in the Mpumalanga province. A key observation amongst these construction projects is the fact that most of them suffer from cost and time overruns and some are ultimately abandoned before completion. The aim of this study was to investigate the causes of construction project failures at DARDLEA.

1.1. Definition of the problem

The performance of construction projects in DARDLEA is measured in terms of what was planned against the actual achievement under the constraints of schedule and budget. According to information obtained from the department's annual report for the 2013/2014 financial year, there was a gross variation between planned and actual achievement in construction projects implemented. Deviations from the targets indicated that some work was not done or was done partially, resulting in construction project failure (DARDLEA, 2014:45). In addition to these bottlenecks, Table 1 illustrates the performance of four prominent projects undertaken by DARDLEA in the province.

Table 1: Project implementation challenges

Project Name	IB Rm	BAC Rm	SD	PCD	ACD (Fin Yr)	Status	Reasons
Nkomazi red meat abattoir	11	12.8	2005	2006	2014	Eight years late, cost overrun,	Lack of funding, contractor inefficiency, lack of funds for operationalization, lack of strategic partner and community dynamics
Nkomazi Poultry Processors Organization	16	20	2005	2006	Abandoned in 2012	Six years late, cost overrun, eventually abandoned	Wrong project location, lack of stakeholder engagement, lack of funds to complete processing and refrigeration facilities, lack of waste disposal facility, lack of poultry farms with capacity to supply the abattoir.
Mbuzini Maize Mill	4	4	2012	2013	2014	Ten months late	Poor project location lack of stakeholder engagement, lack of water, top down approach.
Magogeni Maize Mill	4.5	6	2013	2014	2015	Eight months, cost overrun	Budgetary issues when department was put under curatorship

PCD = Planned Completion Date, BAC = Budget At Completion, IB = Initial Budget, ACD = Actual Completion Date, SD = Start Date

Source: Mzara, 2014

The poor performance of the tabled projects is not unique in the province and are more the rule than the exception.

This study therefore sought to answer the following research questions:

- What are the main causes of construction projects failure in DARDLEA?
- What is the relative importance of the different factors causing project failures?
- What is the relationship among the responses of the different respondents?
- The following hypothesis was tested:
 - H₀: There is no correlation among the responses of respondents on the causes of construction project failures.
 - H₁: There is a correlation among the responses of respondents on the causes of construction project failures.

2. LITERATURE REVIEW

Since availability of literature on the construction in the agricultural sector is limited, the literature reviewed covered construction projects failures in general. From the literature review, it was found that research on construction failures are generally done across industries but are often geographically specific. Despite the geographic locations, it was clear that common factors prevail towards project performance failure. In Saudi Arabia, only 30% of the construction projects were completed within schedule, while in Malaysia, 17.3% of the projects were considered “sick”, meaning that the projects were delayed for more than three months or were abandoned (Sambasivan & Soon, 2006:518). It was also found that the most common cause of project failures in Saudi Arabia projects from contractor and consultant perspectives were changed orders with about 70% of the projects that experienced time overruns (Ikediashi, Ongunlana & Alotaibo, 2014:38).

According to Sweis, Sweis, Rumman, Hussein & Dahiyat (2013:114), the most dominant factors causing construction project failures in Jordan were incompetence, material price fluctuation, lack of experience of the contractor, incomplete drawings, government delays in decision making, inaccurate estimates, poor planning, and low labour productivity.

Due to rapid growth in construction activities, the causes for time and cost overruns in Dubai were attributed to tight construction schedules, unique architectural features, misalignment of international contractors and consultants, as well as unique culture and religious differences (Ren, Atout & Jones, 2008:756).

A study by Toor and Ongulana (2008:10) revealed that the causes of project delays or failures in Thailand were due to a lack of resources, poor contractor management, shortage of labour, design delay and inadequate planning.

During the literature review it was also found that some authors obtain views from, and in some cases, allocate causes of project failures to stakeholder categories.

A study was carried out in Benin by Akgobe, Feng and Zhou (2012:1215) on the importance and ranking of factors causing delay for development construction projects. In their study, a questionnaire was used to collect data from contractors, owners, consultants and architects. Ten factors were found to be causing project failure, namely poor financial position of the contractor, financial difficulties by the owner, poor subcontractor performance, material procurement of contractor, changes in drawings of architect, inadequate planning and

scheduling of contractor, slow inspection of completed work by the consultant, equipment availability of contractor, preparation, approval of drawings of consultant, and acceptance of inadequate drawings by consultant (Akgobe, *et al.*, 2012:1218).

During a study in Zambia, data were collected from consultants, subcontractors, contractors and clients on poor project performance. Poor cost estimation and change orders were ranked as the most common causes of schedule overruns. It was also found that poor financial management was the most common and noticeable factor that caused quality shortfall (Muya, Kaliba, Chicombo & Shakantu, 2013:61).

In Egypt, the causes of project failure were clustered into material-related, owner-related, consultant-related, contractor or sub-contractor-related (Marzouk & El-Rasas, 2014:50). In Ghana, clients, contractors and consultants were key role players in their study of the causes of delay in the construction projects (Fugar & Agyakwah-Baah, 2010:104).

Baloyi and Bekker (2011) conducted a study into the cause of cost and time overruns of the 2010 Soccer World Cup. They identified three stakeholder categories, namely externally-related, client-related and consultant-related factors. In the study, the Relative Index Importance (RII) was used to analyse and rank the results (Baloyi & Bekker, 2011:59).

3. METHODOLOGY

3.1. Research design

To effectively answer the research questions, the researcher used a descriptive case study involving a quantitative approach. The target population was purposely selected and included contractors, owners and clients who were involved in the construction, monitoring and utilisation of projects in DARDLEA. Such a target population was selected since it is believed that they have all the information related to construction projects' performance (Welman, Kruger & Mitchel., 2012:70). The sample size for the study was 44, eight being the client (included all project beneficiaries represented by chairpersons), eight contractors (referring to companies involved in the construction of projects in DARDLEA) and 28 representing the owner. Due to the fact that clients and contractors are difficult to locate, two were sampled from each of the four districts, namely Ehlanzeni South, Ehlanzeni North, Nkangala and Gert Sibande. Owners involved DARDLEA employees involved in the planning, monitoring and designing of construction projects. Seven employees from each of the four districts were involved.

3.2. Data collection

A questionnaire was developed using a 5-point Likert scale for data collection. The 5-point scale was selected to allow for neutral answers when selecting three and two ranges for negative and affirmative answering (Welman, *et al.*, 2012:156-157). Respondents were categorised into client, owner and contractor. The questionnaire included 32 factors causing construction project failures to be ranked by the respondents. The questionnaire was distributed to the respondents via email. Telephone interviews were also carried out with respondents who did not react to the email notification. For client respondents, mostly telephone interviews were conducted since all had valid cell phone numbers with limited access to email due to remote geographical locations. The respondents were sampled from four districts, namely Gert Sibande, Nkangala, Ehlanzeni South and Ehlanzeni North.

3.3. Analysis

Descriptive statistics was used to analyse the collected data. Relative Importance Index (RII) was used to identify and rank the different causes of construction project failures as perceived by the respondents (Assaf & Al-Hejji, 2006:353; Baloyi & Bekker; 2011:60; Sambasivan & Soon, 2006:523). The ranking of the causes was important for identifying and highlighting critical causes of construction project failures in DARDLEA. This would enable the department to focus their efforts in minimising such causes.

$$\text{Relative Importance Index (RII)} = \sum W / (A * N) \quad (1)$$

Where W is the weighting given to each factor by the respondents (1 to 5), A is the highest weight (i.e. 5) and N is the total number of respondents. The RII enabled the researcher to cross compare the relative importance of the factors as perceived by the respondents (Assaf & Al-Hejji, 2006:353; Sambasivan & Soon, 2006:524).

The RII was adapted to conform to the questionnaire being used.

$$\text{RII} = (5v_i^5 + 4s_i^4 + 3i_i^3 + 2sn_i^2 + ni^1) / 5N \quad (2)$$

Where v_i^5 = very important with response level 5, s_i^4 = slightly important with response level 4, i_i^3 = important with response level 3, sn_i^2 = slightly not important with response level 2, ni^1 = not important with response level 1, N = total number of respondents and 5 constant of highest weighting (Ihuah & Benebo, 2014:29).

To determine or measure the relationship about the direction and strength of the correlation among the different categories of respondents, a Spearman's rank Correlation was used (See equation 3),

$$r_s = 1 - [6 \sum d^2 \div (n^3 - n)] \quad (3)$$

Where r_s = Spearman's rank correlation coefficient, d = the difference in ranking of any two parties, n = number of factors (Assaf & Al-Hejji, 2006:353).

If the correlation is between 1 and -1, where 1 refers to a perfect positive correlation (perfect direct relationship/agreement), -1 refers to a perfect negative correlation (perfect inverse relationship/disagreement). Figures near to zero indicate no relationship at all or little correlation while figures close to 1 indicate a good correlation (Assaf & Al-Hejji, 2006:523).

4. RESULTS

A total of 44 questionnaires were distributed with 32 returned. The response rates for each category is indicated in Table 3.

Table 3: Response rate by respondents

	Number of respondents per category	Response rate	Percentage response
Owner	28	20	71.43%
Client	8	8	100%
Contractor	8	4	50%
Total	44	32	72%

The different factors causing construction project failure in DARDLEA were ranked according to the order of importance using the Relative Importance Index (RII) as shown in Table 4.

Table 4: RII of the factors causing construction project failure in DARDLEA

Factor	ID	1	2	3	4	5	RII	Rank
Poor communication	Q_4	0	0	7	8	17	0.863	1
Lack of monitoring and evaluation	Q_25	1	0	4	11	16	0.856	2
Lack of client/beneficiary involvement	Q_20	0	0	10	4	18	0.850	3
Lack of project planning	Q_29	0	2	4	11	15	0.844	4
Financial difficulties	Q_7	0	2	3	14	13	0.838	5
Poor planning and scheduling	Q_6	0	2	5	14	11	0.813	6
Incomplete project drawings	Q_24	0	1	9	12	10	0.794	7
Conflicts	Q_13	0	0	15	7	10	0.769	8
Poor technical performance	Q_1	0	1	12	13	6	0.750	9
Changing client requirements	Q_17	0	5	7	11	9	0.750	9
Incompetent workers	Q_22	0	1	16	6	9	0.744	11
Lack of project handover	Q_27	0	2	10	15	5	0.744	11
Poor performance by subcontractor	Q_3	0	7	10	4	11	0.719	13
Poor schedule of activities	Q_26	0	2	17	6	7	0.713	14
Community unrest	Q_15	0	4	15	5	8	0.706	15
Late payment of contractor	Q_23	3	3	10	9	7	0.688	16
Poor contract management	Q_31	0	8	9	8	7	0.688	16
Poor contractor's experience	Q_10	0	7	10	11	4	0.675	18
Poor material management	Q_5	0	1	24	5	2	0.650	19
Lack of skilled labour	Q_21	0	6	15	8	3	0.650	19
Late procurement of materials	Q_2	2	3	18	4	5	0.644	22
Incapacity of client	Q_14	0	9	11	8	4	0.644	22
Frequent changes in scope	Q_28	1	2	20	7	2	0.644	22
Poor quality of material	Q_11	3	7	9	9	4	0.625	24
Lack of equipment	Q_12	2	5	19	4	2	0.594	25
Escalation of material prices	Q_30	0	4	26	1	1	0.594	25
Poor site inspection	Q_8	2	7	19	2	2	0.569	27
Religious beliefs	Q_19	1	13	13	2	3	0.556	28
Lack of manpower	Q_9	2	8	20	0	2	0.550	29
Unique culture	Q_18	0	17	12	0	3	0.531	30

The top ten ranked factors contributing to construction project failure in DARDLEA in order of their importance were poor communication, lack of beneficiary involvement, lack of project planning, financial difficulties, poor planning and scheduling, incomplete drawings, conflicts, poor technical performance, changing client requirements, and incompetent workers as the tenth rank factor.

4.1. The correlation between the clients, contractor and owner

The Spearman rank correlation was used to test the correlation among the respondents (the contractor-owner, owner-client and contractor-client) relationships in terms of their perceptions on the factors causing construction project failure in DARDLEA. The results of the correlation are shown in Table 5.

Table 5: Correlation among the contractor, client and owner

		Owner	Contractor	Client
Owner	<i>P</i>	1.000	0.288	-0.098
	Significance probability	-	0.000	0.000
	N(number of cases)	31.000	31.000	31.000
Contractor	<i>p</i>	0.288	1.000	0.642
	Significance probability	0.000	-	0.000
	N(number of cases)	31.000	31.000	31.000
Client	<i>P</i>	-0.098	0.642	1.000
	Significance probability	0.000	0.000	-
	N(number of cases)	31.000	31.000	31.000

$p = 0.5$

The results indicate the correlation values among respondents as follows: client-contractor (0.642), client-owner (-0.098) and owner-contractor (0.288). Client and owner disagreed on the causes of construction project failure in DARDLEA, while the contractor-client and contractor-owner agreed on the causes of construction failure in DARDLEA. In terms of the strength of the correlation, a strong positive correlation existed between the client and contractor (0.642).

It was concluded that there were differences in the responses of the respondents on the causes of construction project failure ($p=0.05$), therefore rejecting the null hypothesis.

5. CONCLUSIONS

Most construction projects in DARDLEA were never completed within budget, schedule and cost and some were abandoned before completion. The intention of the study was to investigate the causes of construction project failures in DARDLEA. The factors causing construction project failures were categorised into client-related, owner-related and contractor-related factors. In order to obtain the views of respondents on the factors causing construction project failure in DARDLEA, a questionnaire was developed and administered to different respondents working in the construction projects and those who were part of the project as clients or beneficiaries. The clients were subjected to a telephone interview, while the owners and contractors completed a similar questionnaire that was despatched to them via email. The study revealed that out of the 32 factors studied, the top ten factors which caused construction project failure in DARDLEA were poor communication, lack of monitoring and evaluation, lack of client/beneficiary involvement, financial difficulties, lack of project planning, poor project scheduling, incomplete project drawings, poor technical performance, changing client requirements, and incompetent workers. The correlation indicated that there was a weak negative correlation in responses between the client and owner. It can be concluded that there are significant differences in the responses amongst the clients, owners and contractors.

Key factors ranked highly by the respondents were lack of communication, lack of client or beneficiary involvement, lack of project monitoring and evaluation, and lack of project

planning in the construction projects of DARDLEA. Agricultural projects involving various stakeholders and extension activities should focus on the engagement of relevant stakeholders prior to and during construction.

6. RECOMMENDATIONS

The article explored the causes of construction project failure in DARDLEA and the following provide some recommendations based on the findings of this study:

- A communication plan should be developed and made available to stakeholders involved. All stakeholders should be encouraged to adhere to the plan.
- All project stakeholders should be involved during the planning of projects to enhance project sustainability.
- All project planning, design and scheduling should be approved by the contractor, client and owner before construction can commence.
- Project construction should only begin when there is a guarantee that all plans, budgets and schedules are in place and are realistic.
- There should be a scope management plan to deal with changing requirements of the clients.
- Most of the employees in the construction projects should demonstrate skill in dealing with construction related work.
- As part of extension activities, the results of this study should be incorporated in the presentation and engagement of stakeholders prior to and during the construction phase of the various projects.

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