# The Case for Using Simulation in Land Administration with A Plan to Build Capability and Capacity to Use it Operationally
## *a Focus on Using Simulation in Development Assistance*

**Ken LYONS, Australia; Rohan BENNETT, Australia; Dimo TODOROVSKI, Netherlands**

## SUMMARY

The paper has four parts. Part A Sets the Scene. A view of *success* in Land Administration (LA) using Development Assistance (DA) is outlined. Business areas where simulation is used, and what for, are listed, together with its use in some non-LA areas of DA. The applicability of simulation to LA has previously been shown, Lyons (2023).

Part B Develops the Rationale for using simulation in LA. The approach used is that of Strategy Dynamics (SD). Key characteristics of SD are listed with three major features they facilitate, which are very useful in LA/DA. "Proposition for Discussion" are listed. The following questions are then posed- *As simulation is routinely used in many industry sectors to test plans before investing, why not use or trial it in LA/ DA?  Is LA so different that simulation/SD is not applicable?  If so, Why?*

Part C Provides a Plan to build the necessary capability and capacity to use SD operationally. A four stage plan is outlined with tasks, milestones and a network diagram with indicative durations. Critical success factors are provided with a comment on the Benefits to Efforts ratio. Part D Provides a Short Wrap Up.

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## PART A – SETTING THE SCENE

## 1. *SUCCESS* IN LAND ADMIN (LA) with DEVELOPMENT ASSISTANCE (DA)

### 1.1 What is *Success* or what is sought to be achieved in LA using DA?
One view, used in this paper, is that S*uccess* is: -
- *Achieving* improvement objectives with DA support and financing (~3-5+ years)
- *Maintaining* improvements achieved (with DA), post DA for 10-15+ years, when solely reliant on in country (IC) budget allocation
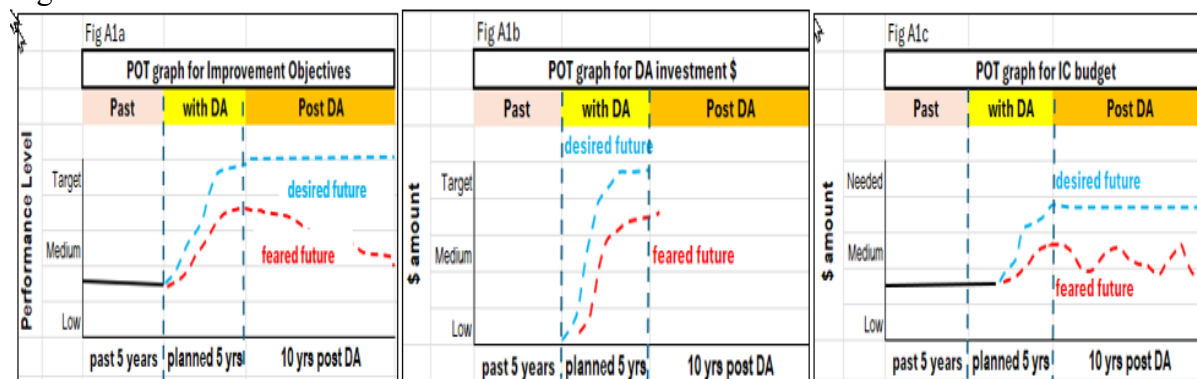
[Development Assistance (DA) is the provision of technical and financial support, either as a grant or a loan, from an aid organisation/development bank to a country/agency to undertake improvements.]

### 1.2 Success and *less than fully successful* -a Performance Over Time (POT) view
POT graphs are an important feature of the Strategy Dynamics (SD) method of simulation. More on SD later in the paper. Fig A1 below shows three POT graphs.

The purpose of the POT graph here is to depict: - past performance before DA, (**black** solid line); desired future performance with DA & post DA, (**blue** dashed line), feared future performance with DA & post DA, (**red** dashed line) for a particular parameter. The parameters of interest are: - the improvement objective, Fig A1a; $s invested in DA, Fig A1b; $s provided in country to maintain improvements post DA, Fig A1c. The **blue** dashed line depicts *success*, and the **red** dashed line *less than fully successful*.

Fig A1



The horizontal axis is common to all three graphs and has three time periods: - the 5 years before DA; the 5 years for a DA project to achieve the improvements: - the 10 years post DA.

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A tenant of the SD simulation approach is that it is necessary to understand what caused past performance, before determining the actions necessary to achieve, and sustain, the future desired performance, the Blue dashed lines.

**Comments**
- In Country budgets commonly do not provide for sufficient maintenance. Improvements achieved with DA normally require increased budget to be maintained. (Fig A1c refers).
- Later in the paper it will be shown that simulation provides the tools to (1) test proposed improvements for effectiveness before investing, (2) determine the conditions under which the improvements could be sustained, post DA.

## 2. THE MAGNITUDE OF THE TASK OF IMPROVING LA

The following are generalised statements drawn from the literature (formal and grey), blogs, and from "land" advocacy organisations seeking to improve tenure security.
- Over past decades considerable DA investments have been made to improve LA.
- While there have been notable successes, widespread success remains elusive
- A significant magnitude of work remains to improve LA to the level seen necessary by many advocacy groups and aid organisations, e.g. Prindex (2024) Report, Global Security of Property Rights reported that 23% of adults globally report feeling insecure about their property rights. Enemark, S et al (2014) note that 75% of the world population do not have access to formal systems to register and safeguard their land rights.

Whatever the numbers, the task remaining is not minor. Part B Sec 8.0 shows how the use of SD can contribute to reducing the magnitude of the task of improving LA.

## 3. WHAT SIMULATION IS, WHERE USED, WHAT FOR

A functional definition of simulation is the use of computing and a model to represent a process or system in the real world. This section considers the utility of simulation for LA.

### 3.1 The main approaches of simulation for LA
A functional definition of simulation is the use of computing and a model to represent a process or system in the real world. This section considers the utility of simulation for LA.

System Dynamics (sd) uses simulation for strategy and policy design and to help make better decisions when confronted with complex dynamic systems. Model results can be used to communicate essential findings to help understand a system's behaviour.
https://systemdynamics.org/what-is-system-dynamics/

Strategy Dynamics (SD) and its software, Silico, are based on sd (system dynamics). SD focus is on improving performance and is the simulation approach used in this paper. SD has nine very useful characteristics which facilitate three high level abilities of important relevance to LA & DA (Part B Sec 5.0 refers).

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Warren K (2009) the developer of SD, notes that SD enables -
*The determination* if a plan <u>will work</u> at all; The *design* of a system so that it <u>can</u> perform well; The *management of* a system so that it <u>does</u> perform well; The *fixing* of a system if <u>problems</u> occur. This encapsulates the utility of SD for LA & DA.

### 3.2 Where simulation is used and what for
A good idea of where simulation using system dynamics (sd) or Strategy Dynamics (SD) is used can be gained by looking at the websites of major sd consulting firms and software providers, sd professional bodies. Some are:- **System Dynamics Society** https://systemdynamics.org/ ; **isee systems** https://www.iseesystems.com/ ; **Ventana Systems** https://www.ventanasystems.com/ ; **Strategy Dynamics** https://strategydynamics.com/

<u>Areas that use simulation</u> are: - development; economics; environment; health care; human resources; policy; social; urban dynamics; business; education; research; government; energy; agriculture; manufacturing; conservation, amongst others.

<u>What simulation is used for: -</u> to test business plans before investing; to take a "system" view to addressing a problem rather than a symptom; to better understand the performance of a system. to explore scenarios for improvement and to determine a strategy to improve performance over time.

### 3.3 The use of simulation in Development Assistance (DA), (in non-LA areas)
Simulation is used in DA in some non LA areas.

The <u>Millennium Institute</u> https://www.millennium-institute.org/ conducts strategic analysis using a systems approach. It conducts "what-if" scenarios for strategic planning success and uses an Integrated Sustainable Development Simulator. Work has been done in 40 countries, many developing, in areas of food, water, health, education, environment.

<u>Earth4All</u> https://earth4all.life/ uses simulation models to show how different policies are likely to affect human well-being, societies and ecosystems in the short and long term.

<u>Nag (2024)</u> use system dynamics in DA to facilitate local solutions through collective learning of complex systems and adaptive change. His website http://www.datamuse.io/ gives brief description of how his approach has been used in a number of countries and in different areas. A fuller description of his approach and some examples is in a webinar of the System Dynamics Society https://www.youtube.com/watch?v=IuzqU8vDXK4

### 3.4 The applicable of simulation (SD) to LA & DA
The applicability of SD to LA & DA is shown in Lyons (2022, 2023). The illustrative examples covered were: Removing a processing backlog; Increasing quality and sustainability with necessary budgets; Upgrading quality when quality has subcomponents under the control of different agencies. Raising capital by using titles as collateral; Addressing informal Go Fast

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fees; Skills development; Options for the first registration of property; Overcoming obstacles to large scale first registration using FFPLA (fit for purpose land administration)

## 4.  SUMMARY PART A and a QUESTION

**Summary**
- *Success* is <u>Achieving </u>improvement objectives with DA and <u>Maintaining </u>improvements achieved post DA
- POT graphs are very useful to depict <u>past</u> performance, <u>future desired</u> performance (*success*), and <u>future feared</u> performance (*less than highly successful*) for key objectives/indicators.
- When improvement projects are *less than highly successful,* the improvements achieved but not maintained will de*cay* over time, and there will be a future need to reinvest
- Investments to improve LA have been occurring for decades but widespread success is elusive. The magnitude of the task is still great.
- Simulation is used routinely in many business areas in developed countries. There are instances of simulation being used in non-LA areas of DA to conduct "what-if" scenarios for strategic planning success.
- The applicability of simulation to LA and DA has been shown with illustrative examples.

**A Question**

| Questions for Discussion |
| --- |
| 1.  As Sim/**SD is used** to test plans **in other areas, why not use or trial in LA & DA?** |
| 2.  **Is LA so different** to other areas, that Sim/**SD is not applicable? If so, Why?** |

## PART B – THE RATIONALE FOR USING STRATEGY DYNAMICS (SD)

## 5.  KEY CHARACTERISTICS of SD & WHAT THEY FACILITATE

### 5.1 Key Characteristics of SD (Strategy Dynamics)
Table B1 below lists the key characteristics of SD.
Table B1

| | Key Characteristic |
| --- | --- |
| 1 | <u>Takes a "system" rather than a symptom view</u> of an underlying structural issue |
| 2 | <u>Explicitly depicts the development logic</u> and interventions as POT (performance over time) graphs with no hidden assumptions |
| 3 | <u>Is quantitative</u> allowing the numerical calculation of effect, based on cause(s), for every entity in the development logic |
| 4 | <u>Can incorporate intangibles</u> (e.g. morale, perception of quality) as well as tangibles (e.g. customers, staff) |

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| 5 | Allows numeric What Ifs /Scenarios to be quickly included and evaluated |
|---|---|
| 6 | Allows much longer time periods than that for DA, to be easily incorporated in a model and improvements examined for sustainability post DA |
| 7 | The SD model contains the core of the business case when financials are included; the model becomes a dynamic business model. Detail can be increased as design develops. |
| | **Other Useful Properties** |
| 8 | Model components are semi standard, can be reused, easily modified, and contribute to a library of common model parts |
| 9 | Different rates of work associated with the use of different technologies/ approaches & work crew sizes & skills can be "tested" for the achievement of objectives |
| 10 | The model, with its explicit depiction of the development logic, allows the easy identification of KPIs and PIs (Key performance indicators and performance indicators) in design, and their explicit tracking during implementation. |
| 11 | SD being quantitative adds value to qualitative methods such as logframe and theory of change |

More detail on SD is available in Lyons (2022, 2023) and from the Strategy Dynamics website and its online courses https://systemdynamics.org/

### 5.2 Major features that the key characteristics facilitate

Drawing from the key characteristics in Table B1, three major high level features of relevance to LA and DA are shown in Table B2

Table B2

| As part of **design** – |
|---|
| • To numerically bench *test* proposed improvements/project designs for *effectiveness* and *sustainability* BEFORE making the investment decision |
| As part of **implementation** (in DA, and post DA periods) – |
| • To track and compare the actual achievement of targets with desired targets (from design and the model) |
| • To test and take corrective actions when desired targets are not being met |
| As part of **sustainability** |
| To determine the likely conditions for the sustainability of improvements post DA, when the in country (IC) LA agency is wholly reliant on IC budget allocations |

A number of "propositions for discussion" can be postulated from the key characteristics of SD and the major features they facilitate. These are listed in Sec 7.0 following.


## 6. PROPOSITIONS FOR DISCUSSION

The "Propositions for Discussion" in Table B3 below arise from Sec 6,1 & 6.2 above, the illustrative LA modelling (Part A Sec 3.4), and field experience.

Table B3

| | **Propositions for Discussion** |
|---|---|
| 1 | A major use of SD in LA/DA is - to numerically *test* proposed improvements/ designs- |

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| | |
|---|---|
| | • for *Effectiveness*, with DA [effectiveness = achieving design objectives]<br>• for *Sustainability*, post DA [sustainability = maintaining achieved improvements]<br>BEFORE making the investment decision |
| 2 | As many LA operational entities are essentially existing government owned businesses, it could be better to initially focus on improving the performance of an existing operational entity.  Success builds confidence to undertake more complex improvements. It could also be argued that if significant difficulty emerged in improving the performance of an existing entity, then undertaking more complex improvements would be challenging. |
| 3 | Projects have more chance of achieving their design targets when: - IC stakeholders have a clear understanding of, and strongly support, the improvement objectives and the development logic and have participated in the bench *testing* of THEIR proposals to improve. |
| 4 | More time should be spent in design on achieving IC understanding and commitment/ buy in. Cooperative design and testing using SD can significantly assist. |
| 5 | Extend project design and testing to include a post DA period (of ~10 years) where the IC LA agency will be solely reliant on allocated budgets to maintain the achieved improvements. Testing should determine the conditions under which improvements can be sustained. |
| 6 | It could be better to design for what a country LA agency can financially sustain post DA, rather than what can be achieved with once off DA, but where improvements may not be sustainable post DA. |
| 7 | Achieving sustainability post DA will most likely require an increased IC budget to the LA agency. [The **blue** desired future line in Fig A1c Sec 2.2]. A possible source of funding is a small percent of the increased revenue from the improvements achieved and sustained. The conditions for sustainability post DA should be included in the design. |
| 8 | Sustainability would be enhanced if once off DA projects were longer, slower, less financially intense, and allowed more time for the in country LA agency to build sustainable capability in step with increasing capacity. This can be examined by the use of scenarios in the testing of improvements. |
| 9 | Include the digital twin/model of the project as an integral part of the regular M&E&IA (monitoring, evaluation, implementation adjustment). This provides the means to easily track the status of actual improvements being achieved to design targets. Implementation. adjustments can include: - modifying the model if it does not reflect the real world; testing proposed adjustments for effectiveness; modifying the implementation strategy or particular parts of the implementation plan, reasonably quickly. |

The impact that these Propositions for Discussion could have on reducing the magnitude of the task of improving LA with DA is discussed in Sec 8.0 following.

## 7.  WAYS TO REDUCE THE TASK MAGNITUDE OF IMPROVING LA

In Part A Sec 2.0 comments were provided on the magnitude of the task of improving LA.

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Some ways to reduce the magnitude of the LA work remaining are: -

- Increase the attention given to how strategic objectives can be achieved. [Attention is routinely given to technical innovation and what might be the most suitable technical method in a particular situation]
- Increase the *rate* of success [success being the achievement of project objectives with DA, and the sustainability of those improvements for 10 (say) years after DA
- Increase the *rate* of completing successful DA projects
- Increase the *capability* and *capacity* of IC Land agencies to be able to use Sim/SD and hence to be able to *test* any desired improvements for efficacy, without the need for DA

The adoption and use of many of the Propositions for Discussion would contribute to reducing the magnitude of the work remaining, via the points above.

*Tenure Security* **-12th Best investments for SDGs (Sustainable Development Goals)**
Lomborg (2023) identifies Land Tenure Security as the 12th most efficient solution of the SDGs, with a benefit cost ratio of 21.1. Supporting publications are Byamugisha & Dubosse (2023a, b).

## 8. SUMMARY & THE RATIONALE for USING SIMULATION/SD

**The Rationale for using simulation/SD in LA with DA**
- *Success* is *Achieving* improvement objectives with DA and *Maintaining* improvements achieved post DA
- Simulation is used routinely in many industry sectors to: - test business plans before investing; to explore and better understand complex situations, and using scenarios, to determine a strategy to address.
- Simulation is also used in some non LA areas of DA to conduct "what-if" scenarios for strategic planning success
- The applicability of simulation using SD, to LA & DA has been shown

- The 7 key characteristics of SD, 4 other useful characteristics, and the 3 major features they facilitate are very useful for planning for *success* in LA with DA. They give rise to 9 *Propositions for Discussion*.
- The adoption of many of the "Propositions for Discussion" would contribute to greater *success* and a reduction in the magnitude of the task of improving LA with DA.

**SD provides the approach and tools to** enable (Warren 2019)-
- *The Determination* if a plan will work at all
- The *design* of a system so that it can perform well
- The *management of* a system so that it does perform well
- The *fixing* of a system if problems occur

**Questions for Discussion**
1. As Sim/**SD is used** to test plans **in other areas, why not use or trial in LA & DA?**
2. **Is LA so different** to other areas, that Sim/**SD is not applicable? If so, Why?**

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**PART C – - A PLAN to BUILD the *CAPABILITY* and *CAPACITY*
NECESSARY to USE STRATEGY DYNAMICS OPERATIONALLY**

## 9.  THE NEED for a PLAN to BUILD CAPABILITY and CAPACITY

*If* one accepts: -
- That there is a strong rationale for using Sim/SD in LA & DA
- That there is currently very limited capability and capacity in SD for LA & DA

*Then*, there is a need for a plan to build the necessary capability and capacity in the LA community that works in DA.

- *Capability* is taken to be the holding (organizationally or individually) of the necessary SD knowledge and skills and the ability to impart that knowledge and skills to others, thus building *capacity*
- *Capacity* is taken to be the process of increasing the numbers with the necessary SD knowledge and skills to carry out the magnitude of work required to be done.

The LA community in DA already works in one way or another to bring about sustained increased capability and capacity in LA agencies /communities in a range of countries. The only difference here is the focus is on increasing the capability and capacity of the LA/DA community in a particular area, i.e. using Sim/SD to improve LA.

An outline plan to build capability and capacity follows. It is a high level plan, and is *A* Plan, not **THE** plan. It is a proposal for discussion.

### Structure of the Plan

The structure of the Plan is: - the challenges and ways to overcome; four stages of the plan with achievements sought and tasks to be undertaken; a network diagram, milestones and indicative timings; critical success factors and the benefit to effort ratio.

## 10. CHALLENGES, WAYS TO OVERCOME & WHAT SEEKING TO ACHIEVE

SD is a new area for LA & DA, and even with a strong rationale for using it, there will be challenges to overcome. This section lists the challenges with ways to overcome them. The major challenges and possible ways to overcome them are listed in Table C1.

Table C1

| Major Challenges | Possible ways to overcome |
|---|---|
| Sim/SD largely unknown in LA & DA community | Establish an interested core group to champion the introduction & uptake of Sim/SD in LA & DA |
| DA agencies have their own procedures to cover all areas of DA | <ul><li>Gain the support of: - DA agencies funding LA; LA specialists who work in/with the DA agencies</li><li>Show how Sim/SD can be used to add value and "fit into" DA agencies procedures</li></ul> |
| Few educational bodies cover LA and DA & don't cover Sim/SD for LA & DA | Gain the involvement of an educational body in Sim/SD for LA & DA, and then be active in teaching, project work, research |

| Lack of Sim/SD models based on real world LA/DA projects and data | Seek DA agencies willing to provide project details and data for educational/research purposes in SD for LA & DA |
|---|---|
| A lack of comparison project designs to compare & evaluate Sim/SD to other methods (say Theory of Change or logframe) | Undertake a comparison design of a completed LA/DA project and evaluate |

**Comments -**Valuable "lessons learnt" would be gleamed from examining previous LA initiatives, such as FFPLA (Fit for Purpose Land Administration), SDTM (Social Domain Tenure Model) from conception to operational use, and incorporating them into this plan

## 11. THE PLAN -GOAL, STAGES & ACHIEVEMENTS SOUGHT

**The Goal is** to have Sim/SD being used operationally in LA & DA projects.

**The Stages of a Plan to build the Capability and Capacity**
The four stages of a plan, and the achievements sought are listed in Table C2.
Table C2

| Stage & Name | Achievements sought [=Milestones] |
|---|---|
| **#1**-Core Group to Drive SD for LA formed & Active | 1. A core group formed and active<br>2. A university department agrees to offer SD for LA & DA<br>3. A DA agency agrees to provide past project data for teaching and research purposes and to be involved<br>4. A Person(s) is willing to prepare initial teaching material in SD for LA & DA |
| **#2**-Build *Capability* to deliver knowledge & skills in SD for LA | 1. Teaching material for SD for LA & DA developed for either face to face and/or online delivery<br>2. A uni, with a DA agency, conducts MSc/research projects<br>3. A core, with expertise in SD for LA & DA, is built up<br>4. An industry awareness campaign on SD for LA and the availability of training/projects is implemented |
| **#3**-Increase *Capacity* to use SD in LA operationally | 1. Increased numbers of students graduating from the uni with knowledge/skills in SD for LA & DA<br>2. Online courses offered and being taken up by LA professionals active in DA<br>3. LA agencies with undeveloped/in transition LA systems recognise the value of employees with skills in SD for LA<br>4. An increasing number of DA agencies see value in SD for LA and are employing those with SD knowledge/skills |
| **#4**- Use of SD in LA under way | SD is being used in operational LA projects with DA |

Major tasks in each stage necessary to achieve the Milestones are shown as activities in the network diagram of Fig C1.

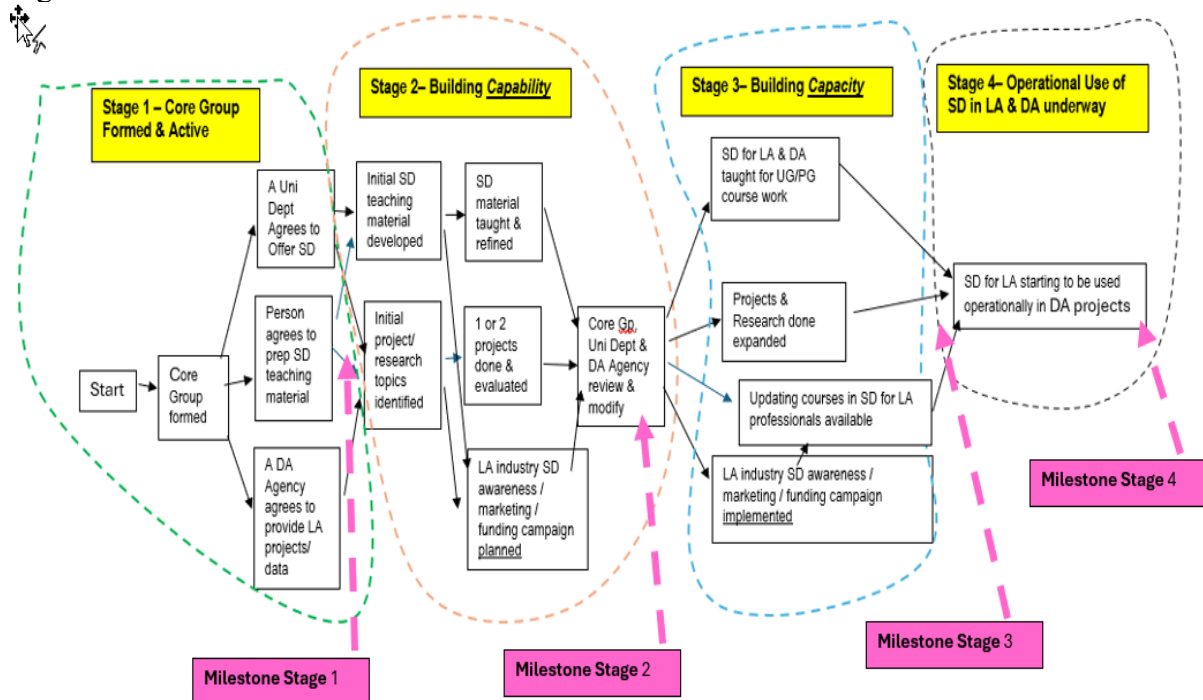**Comments on possible membership of the Core Group of Stage 1.**

- The inner core of this group could comprise the following: - FIG Commissions 2 & 7; a university department active in LA and development with international students; DA agency LA specialist; a person(s) with experience in LA, DA and SD.
- The outer core could include: – the System Dynamics Society (in particular members with DA experience); organisations/ personnel using simulation in some area of development; university departments/ personnel active in teaching quantitative system dynamics; any other organisation/ personnel with an interest in seeing SD for LA & DA advanced.

## 12. A NETWORK DIAGRAM, MILESTONES, DURATIONS

### Network Diagram

The four stages and associated tasks from Section 11 can be developed into a network diagram showing dependencies. Figure C1 refers.

Fig C1



Achieving the milestones for each stage are necessary before moving to the next stage. The milestones were listed in Table C3, Sec 11.0.

### Project duration and the Critical Path

At this point in time there is uncertainty as to how long the various tasks might take. Because of the task dependencies, this duration uncertainty flows through the network. Some ideas of

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possible durations could be obtained from examining the time taken from conception to operational use of previous LA initiatives such as FFPLA, SDTM.

Part way through Stage 1 a better estimate of indicative durations may be able to be made. At that time, it would probably be necessary to rework the stages and tasks. This will affect duration estimates for each stage and overall.

Notwithstanding the above, guesstimates of the durations for each stage are: - **Stage 1**: 6-18 mths; **Stage 2**: 2-4 yrs; **Stage 3**: 2-6 yrs; **Stage 4:** 2-6 yrs.

Since there are currently no reasonable time estimates for activities, it is not possible to identify the critical path.

## 13. CRITICAL SUCCESS FACTORS & BENEFIT TO EFFORT RATIO

### 13.1 Critical success factors (CSFs)

Table C4 lists the CSFs. They are largely based on the achievement of the milestones for each stage (Table C3 refers).

Table C4

| | Critical success factor |
|---|---|
| 1 | That the core group is successful in gaining interest and agreement to undertake Stage 2 from: – a university department; a DA agency; A person(s) with SD and LA knowledge to compile initial teaching material for SD in LA |
| 2 | • That the university department can build and retain a core of capability in teaching and research in SD for LA & DA<br>• That DA agencies, and the host university see value in the work being done by the uni department and both are willing to support<br>• That this SD capability and work produced, are successfully marketed to LA/DA professionals, DA agencies, and "land" advocacy groups |
| 3 | • That the quality and relevance of the work done by the uni department attracts full-time and online students, and commissioned projects/research<br>• That DA agencies are willing to employ graduates, and that LA agencies in countries are keen to have their staff undertake the relevant courses. |
| 4 | That those seeking to improve LA are willing to use Sim/SD |
| 5 | Flexibility is exhibited as plans and circumstances change, so that the strategic objective, "the operational use of SD for LA and DA", is achieved. |

### 13.2 IS SD for LA/DA worth doing? The Benefit to Effort ratio

Whether the endeavour of seeking to increase capability and capacity in Sim/SD for LA & DA is worth doing is very briefly discussed under the heading of benefit to effort ratio, or as commonly put, the pain / gain ratio. Table C5 is a list of benefits, and the effort involved. It is not meant to be a benefit / cost evaluation.

Table C5

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| Benefits |
|---|
| • <u>Higher</u> quality designs<br>• <u>Increased</u> likelihood of *success* – i.e. design targets being <u>achieved</u> (with DA) and <u>maintained</u> (post DA)<br>• <u>Decreased</u> likelihood of the value of DA investments decaying over time, becoming "the fix that failed", and DA support being sought again at some future time<br>• Significant numbers with SD skills using SD operationally<br>• In country LA agency in house personnel have the skills to *test* the efficacy of proposed improvements/interventions |
| **Effort** |
| • The time and effort <u>to go up the learning curve</u> for sim/SD and the associated software, and to gain confidence and competency<br>• To successfully and reasonably quickly execute the plan to build capability and capacity in SD for LA<br>No Pain, No Gain! |

## 14. SUMMARY & CONCLUSION – PART C

**Summary**
- 5 major challenges to building the capability and capacity to use SD operationally were identified with ways to overcome
- A 4 stage plan with milestones and major tasks was developed
- A network diagram was developed with guestimate timings for each stage
- Critical success factors were listed and the benefit to effort ratio commented on

**Conclusion**
A plan to build capability and capacity for the use of SD for LA and DA has been developed, and it is considered worth doing.

### PART D – OVERALL SUMMARY & CONCLUSIONS

## 15. OVERALL SUMMARY & CONCLUSIONS – PART D

**Overall Summary**
<u>Part A set the scene</u> by: - indicating that *success* in LA should include the maintenance of improvements post DA; outlining where and why simulation is used routinely in many areas, and where it is used in DA in non-LA areas, and where the applicability of simulation/SD in LA has been shown.

<u>Part B</u> provided a <u>rationale</u> for <u>using</u> the strategy dynamics <u>(SD) simulation approach in LA.</u> 7 key characteristics of SD and the 3 major features they facilitate were identified and considered very useful in planning for *success* in LA with DA. They gave rise to 9

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*Propositions for Discussion* which, if largely adopted, would contribute to reducing the magnitude of the LA/DA task remaining

Part C provided a high level plan to build the capability and capacity necessary to use SD in LA/DA operationally. Ways to overcome challenges were identified and a four stage plan was outlined with milestones. A network diagram was developed, and critical success factors identified.

**Overall Conclusion**
Simulation/SD is used in many areas, including some non-LA areas of DA (development assistance). It is not used operationally in LA /DA.

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**Questions for Discussion**
1. **As Sim/SD is used to test plans in other areas, why not use or trial in LA & DA?**
2. **Is LA so different to other areas, that Sim/SD is not applicable? If so, Why?**

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company for 30 years. His early career was as an Australian army officer specializing in surveying and mapping.

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