Dairy Farm Strategy in a Volatile, Uncertain, Complex and Ambiguous World

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Abstract
Volatility, uncertainty, complexity and ambiguity are hallmarks of an emerging world, one in which the dairy industry will find itself confronted by a plethora of regulations and imperatives of global and national origin; one in which strategic and operational adaptability and agility will be required. A simulator approach to strategy formulation and evaluation is proposed, an approach that could also underpin the ongoing education and training of unskilled and inexperienced workers.

Introduction
For many decades, prior to the early 1990s, there was little need for the temperate grassland dairy farmer to evaluate the merits of their current strategy, let alone formulate a new one. Once decisions had been made on next year’s stock numbers (up or down), calving date (forward or back), fertiliser and cropping/conservation program, etc., their strategy and modus operandi was, very simply, more of the same, responding as necessary to the vagaries of the market and the climate. Notwithstanding the advent of globalization and an increasingly VUCA (volatile, uncertain, complex & ambiguous) world (Gruwez, 2017), today’s dairy farmers also find themselves having to contend with a plethora of political, economic, societal and environmental regulations and imperatives, that not only impact productivity and profitability, but also their modi operandi. VUCA is the new norm.

Moreover, concurrent with this rising tide of regulations and imperatives, has been the emergence of a hidden and largely unrecognised reality, that of a scarcity of experienced and skilled workers (Hutching, 2018); leaving many farmers with no choice but to employ inexperienced and unskilled workers; and the necessity to also educate and train them.

Knowledge Acquisition
Loss of knowledge, both explicit and tacit, is an outcome of merging what were once generationally owned and operated farms into bigger units, staffed by workers who have little or no local knowledge or farm experience. Explicit knowledge, that which is based on codification, rules, process, etc., is relatively easy to transfer. Tacit knowledge, however, that which is based upon personal experiences, insights, intuition, observations and internalized information (“we know more than we can tell”, Polanyi, 1966, p 4) is more difficult to transfer. Traditionally, the tacit knowledge of one generation, acquired through their experience, has been articulated and codified into explicit knowledge and then passed down to the next generation, internalized by them and, then in turn, passed down to ensuing generations. This flow of knowledge from the tacit to explicit not only created or enhanced both individual and inter-generational knowledge (Nonaka and Takeuchi, 1995), it also built and enhanced inter-generational resilience.

Simulator Approach
The aviation industry has used “flight simulators” to train air-crew for decades, not only to impart and refine the knowledge (explicit & tacit) and skills required to fly an aircraft, but also to expose them to situations that require adaptive and agile responses, thereby imparting experience and thence knowledge.
The learning objective for a simulated flight, by way of example, could be to familiarise a crew with a new route and destination or to confront them with in-flight circumstances that require adaptive and agile responses. Once a “flight plan” has been filed, the responsibilities of the crew include ensuring that the aircraft is adequately provisioned for the flight, flying the aircraft in accordance with the flight path filed in the flight plan and negotiating any adverse weather conditions encountered en route.

*deCida*[^1], a purpose-built dairy-farm simulator, embraces the “flight simulator” approach to learning, and the acquisition and transfer of both explicit and tacit knowledge. It too requires a plan, a farm plan (flight plan), inclusive of production targets, farm average pasture cover (the farm’s flight path) and policies for stock, fertiliser nitrogen, cropping/conservation and supplementary feeding. The feed required to realise a farm plan’s production targets (provisioning) is determined before assessing whether or not pasture growth (rainfall and temperature driven), available pasture mass and supplement inputs are sufficient to meet, not meet (feed deficit) or exceed (pasture surplus) stock feed requirements (figure 1). Farm average pasture cover is used to manage a farms metaphoric flight path (i.e. the accumulation and utilisation of pasture mass) and rainfall and temperature profiles are used to mediate (through pasture growth inputs) the effects (impacts) of the vagaries of weather.

![Figure 1: deCida - Strategy Mode Output for Spring Calving Herd](image)

Pasture conditions, principally pasture mass and sward height in temperate grasslands, mediate the continuous and dynamic interaction between plant and grazing animal that is intrinsic to the grazed temperate grassland ecosystem, as both plant, animal grazing behaviour and performance can be related to prevailing pasture conditions (Bircham 1984; Forbes, 1987; Hodgson 1989; Milligan 1987). Pre-graze pasture conditions can limit bite size compared to that possible under more favourable pasture conditions, the grazing animal’s response being to reduce bite size, increase its rate of biting and to extend the time it spends grazing. Rotational grazing systems, however, can curtail...
such compensatory grazing behaviour, the outworking of which is “small bite sized induced feed deficits”, reduced daily intake and production. In *deCida*, the proxy for pasture condition is pre-graze pasture cover.

In “strategic” mode, *deCida* uses average pasture cover to guide high-level decision making on stock, fertiliser nitrogen, cropping/conservation and supplementary feeding policies, and in “operational” mode it guides everyday resource allocation (size of day & night pasture breaks, supplementation required, etc.) for herds with varying nutritional requirements (e.g. dries, springers, milkers).

It is the use of the average pasture cover dynamic implicit in the pasture-animal interface, rather than an abstract artefact such as “rotation length” or “pasture allowance/offer”, to both assess the state of the grazed ecosystem and to also manage it, that sets *deCida* apart from spreadsheet driven feed budgets and many extension products based on research models.

**Strategy – A Continuous & Evolving Process**

Farm strategy formulation and evaluation is an evolving and never-ending process (Milligan, 1987), not an annual one-off exercise. This refining process is necessary to accommodate not only the vagaries of climate, but also the changes to stock, fertiliser, cropping/conservation and supplement policies that invariably occur. Moreover, as seasons unfold, threats to the achievement of objectives, irrespective of their origin, become more apparent, as do opportunities. To be able to foresee emerging threats, long before they become reality, and to have the time to provision contingency measures should they become necessary, is one of the many benefits of continuous strategic review.

Equally as important as the ongoing development and refining of strategy that a VUCA world demands, is the need to address the increasing loss of tacit and explicit knowledge from the dairy industry. Simulators, like *deCida*, with their capability to underpin learning, knowledge acquisition and resilience enhancement, have the potential to redress, at least in part, this loss.

In summary, a dairy-farm simulator provides a quick and easy way of fleshing-out and refining farm resourcing and system ideas/strategies without having to commit real-resources or to make expensive mistakes. If the ideas/strategies evoked by an idea/insight do not stack up, irrespective of the reason, nothing is lost. In fact, there is gain, learning; knowledge that an idea/strategy does not stack-up in a particular context. In a VUCA world, such knowledge could be the difference between the success and failure of a dairy enterprise.

**References**


Notes: 1/ deCida - Portuguese for decide, make up your mind.