



A Partnership for Sustainable and Profitable Dairy Farming in Western Australia

ENVIRONMENTAL BEST PRACTICE GUIDELINES 1.0 FARM PLANNING





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FARM PLANNING



1.0 FARM PLANNING

In addition to managing the husbandry, mechanical and financial aspects of their enterprise, dairy farmers need to deal with specific environmental issues that relate to the particular farm and operation. All aspects of the farm should be coordinated together in a farm plan.

A farm plan typically consists of an aerial photograph and associated overlays of physical features (ridges, valleys, flow lines, height contours and soil types) and farm infrastructure. Farm plans also detail proposed works for efficient, sustainable farming including designs and costing, soil tests, crop yields and fertiliser application records for each paddock

The plan is an important tool that farmers can use to integrate planning and management of environmental issues into the overall management of the farm. Farm infrastructures and practices should be designed to minimise soil erosion, nutrient export and air and noise pollution while remaining practical and profitable for the management of the farm. Farm planning is an ongoing process and the plan should be reviewed and updated at least yearly.

Far from being just another imposition on the farmer, farm plans have been shown to boost production efficiency. The time spent developing the plan will be repaid many times, as subsequent farming operations are made more efficient and resources such as fuel, soil and fertiliser are saved. Farm plans can also be used to illustrate physical aspects of the farming business in discussions with bank lending officers, consultants, government agency staff and neighbours.

Farm planning will enable you to develop an overall whole farm plan that minimises environmental impacts, design future works and implement effective sustainable practices efficiently and cost-effectively.

There are four key tasks critical to the development and improvement of any farm plan. These are:

- *Data collection*
To be able to develop a whole farm plan, data about your property and other relevant information such as cost of materials for planned work must be collected first. Many factors are combined in the planning of farm management and future developments. These often include paddock subdivision, access, crops, shelter, water supply, habitat, pest/weed control, fire protection, livestock needs, soil conservation, land degradation, water quality and labour. As much relevant information about your property and future plans should be included in the whole farm plan.
- *Developing a whole farm plan*
Effective property planning is all about designing sustainable land management. Good planning takes into account land capability so that appropriate management to reduce present and prevent future degradation can be applied. Improving natural resource condition should be a goal of all land managers. A whole farm plan (WFP) identifies landscape characteristics and helps match land use to the natural landscape's capability. Property planning helps to identify important management and environmental issues and enables you to develop practical solutions to problems.

- *Record keeping*

Organised record keeping is the key to running a successful business. It will provide you with the right information to make decisions more effectively and stay on top of financial matters. Good record keeping is about documenting significant farm events such as stock movements, results of soil, plant tissue and water analysis, irrigation and rainfall events, targeted and actual crop yields and/or stock production, imported feed, manures or effluent, fertiliser application rates, times and spatial variation. In many instances, this information can be derived from tax invoices and receipts. Farmers with computing skills can have their plan maps and records stored on computer making updates and calculations required for the future planning and assessment much easier.

- *Monitoring & assessment*

The final essential task after developing and implementing a whole farm plan to achieve the goals you have set is to monitor your progress toward achieving these goals. As the Whole Farm Plan is implemented, try to evaluate how the plan is working and don't be afraid of making minor corrections and adjustments as required. Monitoring the fundamental components of the farm such as soil nutrient status and pasture quality, is vital to achieving long-term business goals.

Be prepared to liaise with neighbours when planned aspects of your operation may impact on them.

The planning process allows you to cost and budget future developments. Planning also allows you to keep track of all farm activities and helps you identify where changes will save you valuable resources including time, labour and money.

Consultants can be engaged to help you develop your farm plan. They will normally start by helping you identify the information that should be included in your plan. Later they can suggest where and how changes can lead to improvements on the farm.

In developing and maintaining a farm plan, the main issue is not cost but the dedication and time needed to follow the plan and make changes when needed.



With the help of aerial photos and historical records of your property, a whole farm plan can be generated to make scheduling and costing of future plans more effective and time efficient.



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1.1 DEVELOPING AND IMPLEMENTING A WHOLE FARM PLAN

A whole farm plan (WFP) identifies landscape characteristics and enables you to match land use and management to the natural characteristics of the landscape, such as soil type, landforms and vegetation. Property planning also helps to identify environmental issues, concerns and the development of practical solutions to problems.

Property planning is all about achieving sustainable land management. Good planning takes into account the capability of your land so that appropriate management can stop, reverse and prevent degradation. A WFP provides the basis to integrate practices that provide the most effective and economic means of production for a property. A WFP will ensure the farm can adopt highly effective practices at minimum cost and harmful environmental impact.

A WFP not only identifies characteristics of the property and how they should be managed but can also be used to clearly outline family goals, business objectives and legal responsibilities, such as water licensing and maintenance of remnant vegetation. The preparation and adoption of a WFP is the best way to integrate and implement environmental best management practice.

Implementing good practice

The WFP normally includes aerial photographs and detailed maps of the property identifying drains, laneways, irrigation bays, tree lines, effluent ponds, irrigation sources, nutritional status of soils, areas of flood risk, the location of buildings, presence, location and status of native vegetation, wetlands and other habitat areas.

Husbandry inputs need to match the productive capacity of the land. Development activities should concentrate on those areas from which the greatest returns are likely. Activities such as farm forestry and revegetation should be located in areas appropriate for water balance, shelter, productivity, timber utilisation and linkages with remnant native vegetation.

A WFP should be viewed as a blueprint for future farm development and the owner/operator must be involved in every aspect of its design. As knowledge is gained, changes in the WFP may be needed. As landholders learn and farm or family goals change, the WFP should be reviewed and actions describing where and how future work is to be completed should be indicated to match the desired goals of the family running the property.

Preparing a WFP requires a detailed property survey. This involves a surveyor taking levels on a grid basis. Once the survey is done, a contour plan is developed and layout options are discussed with the farm operator in consultation with others as required. These discussions may include professional staff within the Department of Agriculture and Food, Department of Environment and private consultants.

Aerial photographs and digital elevation maps (contour maps) may be available for some properties from the contacts mentioned above as well as from Harvey Water for irrigators.

- Allows you to better understand how your landscape works and how to respond to the various land management challenges and opportunities the landscape poses
- Encourages more sustainable land use and reduces environmental degradation
- By matching inputs to areas of the farm that give the greatest return, production levels may increase and efficiency of resources is improved
- Increased ability of landholder to financially plan for future developments and prioritise productive activities and environmental management
- Allows for sensitive areas to be rehabilitated and protected from further damage, including uncontrolled grazing of riparian areas
- Improves land condition, pasture composition, biodiversity and reduces and controls soil erosion and pasture decline

Further Information

Thompson, C and R Standen. 1998. Managing nutrients on irrigated dairy farms. Goulburn Broken Catchment Management Authority. Victorian Nutrient Management Initiative.

Clifton, C, C Mc Gregor, R Standen and R Fritsch. S. 2004. Landscapes and Industries Program, Current Recommended Practices for Broadacre Dryland Agriculture. Murray Darling Basin Commission, Canberra. www.mdbc.gov.au

Guise, N. 2004. What is property planning? Web note. Department of Agriculture Western Australia.



1.2 DATA COLLECTION

It is important to carefully plan changes on the farm. The development of a land management or whole farm plan is an ideal way to identify issues, set priorities and plan how to address them on the farm.

Many factors are combined in planning farm management and future developments including: paddock subdivision, access, crops, shelter, water supply, habitat, pest/weed control, fire protection, livestock needs, soil conservation, land degradation, water quality and labour. The development of a whole farm plan requires comprehensive data on your property.

A farm plan typically consists of an aerial photograph and associated overlays of physical features such as ridges, valleys and flow lines, height contours and soil types as well as existing farm infrastructure. Farm plans also detail the works proposed for efficient, sustainable farming including the design and costing of works, soil tests and records of crop yields and fertiliser applications for each paddock.

The plan is an important tool to help you integrate environmental considerations into the overall management of your farm. Farm infrastructures need to be located to minimise soil erosion, export of nutrients and chemicals and the impacts of air and noise pollution while being practical for the management of the farm.

Farm planning is an ongoing process and the plan should be reviewed and updated at least once a year.

Essential data collection is the first step in developing a whole farm plan. The data required is listed below.

Implementing good practice

To start a whole farm plan, an accurate scale map or aerial photo of the property is required. Aerial photos of most areas are taken regularly by the Department of Planning and Infrastructure. Details are available from local offices.

- The mapping and planning process normally involve three plastic overlays to an aerial photograph. The first overlay records natural features of the land such as soil type(s), remnant vegetation and shelterbelts, eroded and erosion prone areas, wet/low areas and water-bodies. The second overlay includes the existing features such as laneways, fences and houses. The third overlay presents the proposed/ideal layout and may include smaller/larger paddocks, new laneways and revegetation strategies.
- Viewing the overlays concurrently shows how the existing features can work towards achieving the “ideal” farm. For example, adjustments to be made to existing fencing that will save money and improve management by reducing stock travel time may become strikingly obvious.

Data on the following aspects of your property must be collected to develop a whole farm plan.

- Soil types. Map soils in manageable-size units (land management units). Obtaining a soil landscape map of the district makes soil mapping much easier. Computer programs, such as AgMaps Land Profiler are available from the Department of Agriculture and Food and provide a range of maps, photographs and descriptions for over 50 soil types.

- Surface water control. For properties in irrigated, hilly or flood plain areas, the most essential works map is the surface water control plan. Erosion control earthworks need to be planned to ensure that they will not adversely affect other areas of the farm and neighbours' operations. The paddock layout, access and all other infrastructure need to be planned around the erosion control earthworks. For example, access tracks can be located alongside grassed waterways and diversion banks. Farmers on river flood plains should consult their local catchment group to ensure that proposed surface water control works fit the guidelines of their catchment flood plain strategy. In this way, soil erosion and nutrient pollution during flood events can be minimised.



Keeping a clean office with a basic computer and learning how to use programs like Microsoft Word and Excel can make record keeping very easy

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- Watercourses and drains. The location of watercourses and drains should be drawn on the first overlay that maps all natural features. Watercourses and main drains should be managed to prevent further degradation and should be incorporated into a rehabilitation/management plan to fence off and revegetate.
- Opportunities to harvest surface water. Water is a scarce resource in Western Australia. In some areas where the streams are saline or water supplies are inadequate, it may be useful to harvest water using diversion banks into dams constructed on hillsides. In these situations, surface water control planning is a first step towards obtaining more water.
- Fences and infrastructure. The whole farm planning process involves mapping the location of current and proposed infrastructure and works. Farm infrastructures that may impact on soil, land and water include dairies, effluent ponds, silage bunkers, access tracks, laneways, fencing, chemical storage sheds, fuel tanks and fertiliser storage facilities. It is difficult to compensate for poor location of farm infrastructure by trying to improve operational management. For example, a fence in the wrong place may be an ongoing impediment to efficient fertiliser application or effective surface water control. By using farm plan maps and photos, the fence could be optimally located according to soil type and terrain or alongside waterways and access tracks
- Windbreaks and vegetation. The location of windbreaks, vegetation corridors and buffer zones should be drawn on a separate overlay. These areas may have buffering, soil conservation, and flora and fauna habitat and water resource protection values. Developing a concept plan is the only way to ensure that these values are enhanced where possible, while not impeding other practical aspects of farm operations.
- Paddock fertiliser history. Soil and paddock maps can be linked with recorded data such as yield, time of cropping, fertiliser application, disease history and soil tests, building up a history of inputs, production and soil quality for each paddock. These records give a clear picture of where operations need to change or where infrastructure needs to be relocated.
- Paddock history. The record of crops and pasture grown in each paddock each year can be linked to records of yield, disease outbreaks and chemical application.
- Monitoring locations. Soil monitoring points, sampling lines (also known as transects) and water monitoring points where applicable, should be marked on a map.

Once you have your photo, a great option is to do a WFP course. The advantages of these courses are that they:

- a) give you access to experts and information in particular fields (ie. erosion, subdivisions).
- b) encourage discussion and interchange of ideas between farmers, and
- c) ensure that your plan is largely complete.

Courses usually run in the evening - contact your local Landcare or TAFE for further information.

There are computer programs such as MicrostationTM and AutoCadTM currently available that will allow you to superimpose various layers of data onto a digitalised photographs of your farm but these are expensive to purchase and require specialised skills to use. It is conceivable that this will change in the future eliminating the need for paper maps and plastic overlays.

Further Information

Department of Primary Industries. 2004. Whole Farm Planning. Department of Primary Industries, Victoria. www.dpi.vic.gov.au
Potato Growers' Association of WA, Department of Agriculture Western Australia, W.A. Vegetable Growers Association, Department of Environmental Protection, Western Australia, Waters and Rivers Commission, Western Australia, Western Potatoes, and Horticulture Australia. 2002. Code of Practice for Environmentally Sustainable Vegetable and Potato Production in Western Australia. www.agric.wa.gov.au

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1.3 MONITORING AND EVALUATION

The next phase after developing and implementing a whole farm plan is to see how well you are progressing towards your goals. Monitoring and evaluation are on-going processes and you need to be prepared to make any necessary changes along the way.

Effective farm monitoring and progress evaluation are needed to help you achieve your business purpose and goals within your set time frame. Keeping good records and checking your progress allows you to see how your farm plan is working. If what you have planned is not helping you reach your goals, or if some particular aspect just isn't working the way you expected, it's time to revisit the plan.

Implementing good practice

To properly determine if you are progressing according to plan, targets need to be set. The best targets are those that are Specific, Measurable, Achievable, Realistic and Time-bound (SMART). Some example of SMART targets could include:

1. native vegetation in good condition will cover 10% of property within the next 15 years
2. construct an effluent solids separation system and effluent pond for 300 cows within the next 12 months.
3. increase pasture use by one ton per ha and reduce N use and operating costs by 25% over the next three years

A monitoring program should be implemented to assess the performance of the dairy management system. Monitoring tools and resources needed are covered in other sections of these guidelines. The following are some of the key focus areas that should be monitored to ensure efficient and sustainable farm production:

- Monitor pasture growth and composition along with regular soil testing to ensure soil nutrient status is adequate
- Monitor milk production, condition score and health status of animals
- Regularly observe paddock health for signs of waterlogging, soil acidity, salinity, surface runoff, soil nutrient concentrations and soil water balance
- Pumps, pipelines and effluent irrigators should be regularly checked for blockages, regular maintenance of solids traps and emptying of ponds
- A program of checking adjacent watercourses and groundwater (where relevant) should be undertaken to ensure effluent and fertiliser practices are having no effect on water resources

Monitoring and assessing you progress allows you to keep track of all farm activities and make changes and improvements where required.

Costing

The resources invested in monitoring and assessment can be drastically reduced by using automated computer technology. Although initial capital and training costs may seem overwhelming at first, the positive results are often realised in the immediate short term.

Further Information

Ho, CK, A Robinson, DR Miller and MJ Davis. 2005. Overview of sensors for environmental monitoring. *Sensors* 5:4-37.

Jerrat, N. 2004. Error Resilient Radio Transmission of Wavelet Compressed Images, Masters Thesis, Curtin University of Technology, Western Australia.





1.4 OCCUPATIONAL HEALTH AND SAFETY PLANNING

An occupational health and safety (OS&H) plan is developed and implemented to lessen the risks of injury caused by farm machinery, agricultural chemicals, storage bins and exposure to dust and noise. Raising the level of safety awareness of all people on the farm is imperative and developing an OH&S plan is a good way of ensuring this happens.

The ultimate responsibility for farm safety rests with the farmer. All employees and working family members should be in good health, adequately trained and understand potential risks and hazards of their tasks. Operations should be well resourced to ensure the right tools are used for any job. Workers should be well rested. Procedures to handle emergency situations and serious injuries need to be understood by all people working and living on the property.

Implementing good practice

- Develop and implement a farm occupational health and safety plan outlining guidelines, induction and operating rules for all areas of the farm. This plan will need regular reviewing and you should regularly inspect all areas of your farm to identify and rectify hazardous and/or faulty equipment and machinery.
- Tractors and machinery are leading causes of death and injury on Australian farms. Protective measures such as guard structures, dust extractors, electrical safety switches and roll over protection bars should be fitted on all tractors.
- Excessive noise can induce hearing loss. Always use hearing protectors when operating machinery.
- Protective clothing, sunscreen and sunglasses should be worn to prevent skin cancer and eye damage caused by excessive sun exposure. Wear appropriate footwear when using electrical tools and operating heavy machinery. Use qualified tradespeople to do any work you are not familiar with.
- Handle, store and dispose of agricultural chemicals appropriately. See section 10.2-10.7 for further information.
- Manage stress by having regular rests, including holidays. Improve your planning and time management skills. Provide training, share workloads and delegate jobs. Use contractors or casuals during periods of high labour demand.

Benefits of Implementation

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- Improves health and well being of family and employees
- Encourages a more productive work force
- Reduces incidence of workplace accident, injury or illness and risk of related litigation
- Prevents exposure to chemicals that pose immediate or long-term health risks
- Undertaking accredited OHS training may allow you to negotiate lower insurance premiums

Costing

To develop an occupational health and safety plan there are no costs involved. Time is needed to access relevant information. Information to help farmers create an OHS plan for their property is readily available via the internet.

Further Information

www.workcover.wa.gov.au

www.safetyline.wa.gov.au/worksafe

www.mdbc.gov.au

Clifton, C, C Mc Gregor, R Standen, S Fritsch. 2004. Landscapes and Industries Program, Current Recommended Practices for Broadacre Dryland Agriculture. Murray Darling Basin Commission, Canberra.

www.farmsafe.org.au