

## Learning from farmers - the check approach

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### **Abstract**

In the early 1980's it was recognised that the transfer of technology diffusion model was failing to deliver. There was a need for a new approach. This was the Check Approach. It was developed as a method of speeding technology transfer by finding better ways of collaborating and communicating with farmers. The Check Approach is based on the checking of farmer paddocks or farms to identify the key factors or checks linked to higher productivity, sustainability or profitability. It is a systems approach which has demonstrated that farmers need to adopt all the key checks to achieve targets, not just one or two.

The Check Approach was first tested on irrigated wheat in 1984 with the formation of the Finley Irrigated Wheat Five Tonne Club. Following the success of the Wheat Club the Check Approach was adapted for rice growing with the commencement of Ricecheck in 1986. After 13 years Ricecheck remains the main delivery of technology to rice farmers and retains crop checking as a significant learning tool for farmers. The Check Approach has formed the basis of many other paddock checking systems. The principles have been adapted for other industries and for other uses. Irrigated Subcheck for irrigated subclover was developed in Finley area between 1992 and 1994. As for wheat and rice Subcheck found a big difference between the farmer adoption of best practices, actual farmer practice and perceived practice.

In 1994 the Check Approach was used to develop a package of simple financial and whole farm benchmarks called Bizcheck designed to help farmers improve their skills in business management and improve the profitability of their businesses. Instead of linking the key factors or checks to higher yields, the key checks are linked to profitability on a whole farm basis. Opportunities exist to utilise the Check Approach for quality assurance.

### **Key Words**

Checking, learning, checks, farmers, paddocks, groups, comparative analysis

### introduction

I came to the Finley district in 1976 as a relatively new graduate wet behind the ears and knowing little about the district let alone the crops and pastures grown. I looked to the older agronomists for advice. They said get out of the office and do as many farm visits as you can. Build up your credibility they said. So I did this for a number of years. The hours were long but I thought it was great.

In the early 1980's the cost-price squeeze and pressures on farmers to perform better significantly increased. There was also the recognition there were big gaps between research and farmer yields and between the "top" and "bottom" farmers. Farmers and industry started asking some hard questions as to why farmer yields were not increasing at a faster rate. Extension programs were very much based on overcoming single factors. Farmers who won wheat crop competitions were justifiably proud of their efforts at producing the highest yielding crop in any one year but how many could do it again the following year ? Did they really know how they produced the high yielding crop ? Why were most of these winning farmers unable to reproduce the form ? The results of these winning crops were always well publicised yet most farmers were unable to match the winning crop. This led to a sense of unease that the widely accepted transfer of technology model of research ► knowledge ► transfer ► adoption ► diffusion (6) was too slow in transferring technology and in creating change. There was a need for a fresh approach(14).

In 1983 I paused for a moment. I realised farmer yields were not increasing. Why was it that the plethora of farm visits, field days, research trials and press releases were not increasing yields ? I thought about it. Why put in a lot of hours and get little back for it. Lots of farm visits and talking to farmers was great but it was getting us nowhere. Why couldn't the farmers growing the top crops this year do it again next year ? There must be another way ! I thought some more.

The answers must lie in those top yielding paddocks, but the trick is how to find the answers. What is really different about the top paddocks compared to the lower yielding paddocks ? Maybe we do not know as much about those paddocks as we think. Perhaps we are missing some key ingredients. The only way to find out is to check the paddocks more closely. The farmers tell us they are doing everything right but are they ? They say the neighbour's crop over the fence looks much the same as on this side, but why was his yield higher ?

Well that's enough thinking , now it's time for action. Time for a new way of doing extension. I had heard of a farmer club somewhere but had no details. Sounds a good idea to me ! Let's start up our own club for wheat where the farmer club members agreed to enter their best paddock, use the latest recommendations (or rules) and monitor and record management (club minutes). This was the beginning of the Check Approach , farmers checking crops and learning from this.

### A New Approach to Extension

This new approach was based on finding out what was actually happening in farmers' paddocks rather than on what was perceived to be happening. In hindsight it was similar to the idea of Indigenous Technical Knowledge (ITK) or local knowledge and the Farmer First Idea (15). How could an adviser help a farmer diagnose a disappointing yield if the farmer or adviser had never looked at the crop between sowing and harvest ? Was the factor causing the loss related to disease, weeds, pests, establishment, nutrition or moisture ? Without checking of the crop there is no way of really knowing. Instead of measuring the results from top yielding research plots the new approach measured the results from the top yielding farmer paddocks. The key factors or checks linked to yield were then identified from farmer paddocks. The higher the number of checks adopted the higher the yield. The new approach looked over the shoulder of the top farmers or over the top crops rather than just looking at research plots. The Check Approach evolved as a method of researching with farmers in their own paddocks and finding out answers from their own paddocks. The process in hindsight followed the Kolb learning cycle (9). I had a situation I wanted to improve which I reflected on which led to a proposed way of learning and then trying it out via the Five Tonne Wheat Club (10) initially then as Ricecheck. The Check Approach itself utilises the Kolb learning cycle (3) and could be described as a second loop of learning (1). This has led to an alternative to the transfer of technology model. The change is from a one way communication flow to a multiple flow model with flow from farmers to farmers, farmers to extension and researchers and vice versa. The Check Approach is an extension model involving farmers learning and sharing knowledge with other and with researchers and extension workers playing a key and pivotal role to facilitate the learning. The principle of farmer back to farmer has also been advocated by Rhoades and Booth (15). The flow of technology and information is as much from farmers to farmers and to researchers as it is from researchers to extension to farmers. The Check Approach has attempted to speed up technology transfer by treating farmers as researchers in their own right (5) and assisting this process through the use of adult education.

Table 1 shows the main differences between extension as I perceived it in the early 80's and the Check Approach

**Table 1. Traditional extension and the check approach**

Traditional	Check Approach
Solve 1 factor	Solve all factors

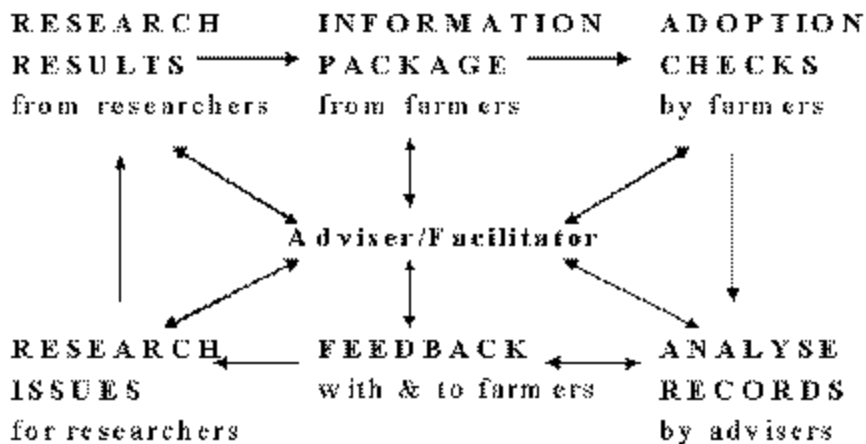
Single factor information  
 Motherhood recommendations  
 No recognition of farmers as researchers  
 One way communication-research-extension-  
 farmers  
 No paddock checking  
 No benchmarks  
 Little use adult education principles  
 No facilitation  
 Few learning tools  
 Lack of target setting

Information packages  
 Objective recommendations  
 Recognise farmers as researchers  
 Two way communication-research-extension-  
 farmers  
 Paddock checking  
 Benchmarks to aim for  
 Wide use adult education principles  
 Facilitation practised  
 Range learning tools  
 Target setting

### The Check Approach

The Check Approach is an extension process involving farmer participation which provides a framework for achieving farmer and industry goals. The features of the Check Approach which are common to existing farmer packages and those under development are:

- The check title eg. Ricecheck which both markets the approach and implies action in terms of checking.
- The setting of either farmer, industry or community targets. These may relate to paddocks or farms for productivity, sustainability, business profitability or market quality.
- The identification of important factors or checks which must be adopted in order to reach the target.
- The checks are identified from observing, measuring, recording and analysing farmer paddocks, farms or farm businesses. This gives the checks credibility with farmers since the checks are derived from their own farms.
- The checks are described simply and objectively. This reduces information overload and aids communication and understanding.
- The assembly of an objective farmer management package which is based on all the key checks needed. Objectivity of the checks eg. 150-200 plants/m<sup>2</sup> is important because it results in clear communication to farmers, advisers and researchers and can be readily measured.
- Education of farmers in the implementation of the checks is very important. This is achieved through progressive learning steps. These are: observing ► measuring ► recording ► interpreting ► acting
- The aim is to educate farmers to improve their learning and performance at each step as well as moving from step to step over time. Eg. observing a crop by walking through it is more effective than driving past in a ute. Some farmers may never progress beyond the observation step while others will progress through all the steps. Learning aids can be provided for each step. TOPCROP (19) the national program of crop monitoring is providing such aids as record cards, fertiliser decision cards and training modules in disease identification and nitrogen management. For Ricecheck the 0.1m<sup>2</sup> plastic rice ring used for population counts and wet weight nitrogen assessment is quite famous.
- Discussion groups provide an ideal learning environment. The groups encourage farmer learning and collaboration. Farmer feedback on the package is an important part of the process which allows farmers to influence changes and develop ownership of the packages.
- Evaluation of the adoption of the package by farmers is easy provided farmer records are available by simply adding the number of checks adopted. Poorly adopted checks and barriers to adoption can be identified.
- The package can be updated after analysis of farmer records and any new research findings incorporated.



**Figure1. Check approach model showing the steps and communication flows**

### Use Of The Check Approach

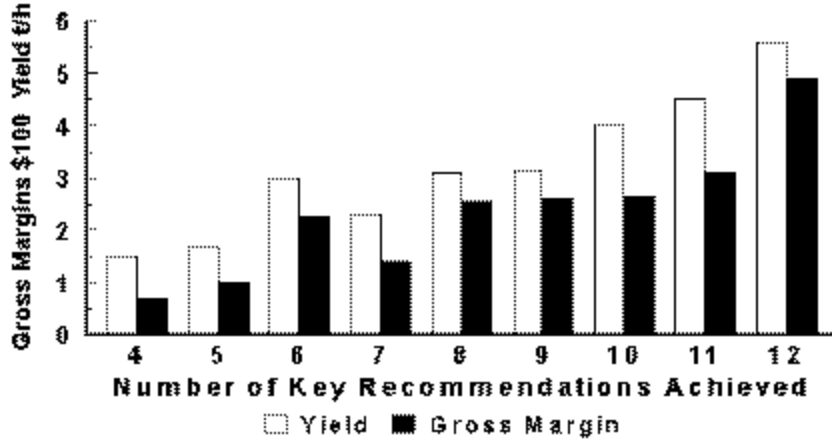
The Check Approach was first tested on irrigated wheat in the Finley district in 1984 followed by Ricecheck in 1986. The principles or ideas were then used for a number of crop checking systems including Meycheck (18), Canola check (16), Maize Management system (7) and Soycheck (17). As mentioned the crop monitoring concept has gone national under the umbrella "TOPCROP Australia" where a large range of crops and pastures are "checked". It would be impossible to review all the crop monitoring programs in current use so for the purposes of this paper I will show results of programs I have been personally associated which demonstrate the development and current use of the Check Approach.

### Results

#### *Finley Irrigated Wheat Five Tonne Club*

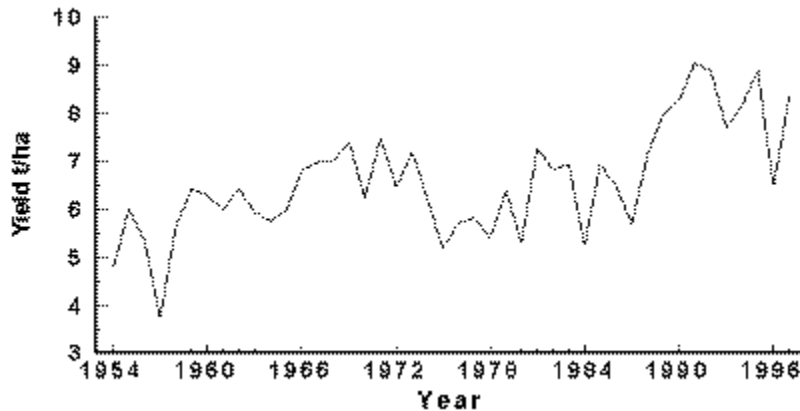
This was the first use of the Check Approach. It commenced in 1984 with 34 farmer members and had 90 members by 1986. The process was explained inside the club booklet (10). "We ask you to keep records of your wheat paddock, get you to return the records, we then analyse all the paddock records returned then pass the analysis results back to you". The Club was also able to demonstrate that in order to improve yields all the key factors or checks were important and that farmers could not simply pick out one or two checks (Figure2). The results of figure 2 were entirely based on information from farmer paddocks.

**Figure2. Wheat yield, gross margin and checks achieved by five tonne club farmers 1987-89**



*Ricecheck*

Ricecheck is perhaps the best known example of the Check Approach from which many of the ideas for other check or crop monitoring systems were developed. In the 20 years preceding Ricecheck NSW rice industry yields increased only slowly averaging 6.8t/ha. Most farmers could grow 10t/ha in odd years but were unable to consistently reproduce these high yields in other years (13). Ricecheck commenced in 1986. Average yield since the commencement of Ricecheck has been 7.7t/ha with 8.4t/ha over the last 6 years excluding the coldest year in the history of the industry (Figure 3). This is a 23% increase in yields over this period.



**Figure 3. Average NSW rice yields from 1968 to 1997**

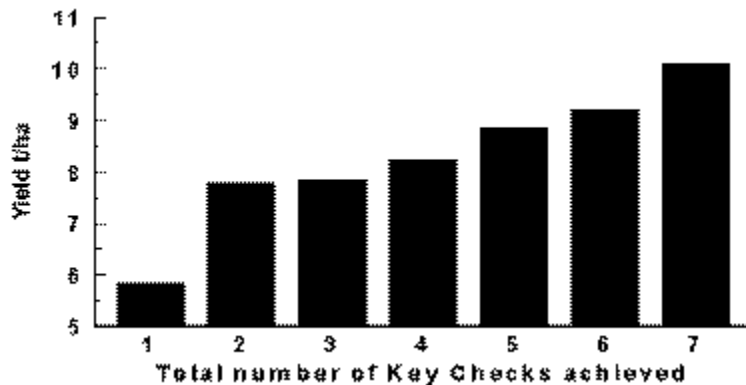
As with the Five Tonne Wheat Club the big change in rice culture was to give farmers a reason for walking into and checking their crop which was almost unheard of before Ricecheck. Table 2 shows examples of "crop checked" paddocks in 1986 which demonstrated the enormous variation between paddocks and non adoption of checks. These results proved that "farmers paddocks were not the same as each other".

**Table 2. Selected crops in the Finley district in 1986 showing yield and check indicator variation**

Recommended Check	Crop 1	Crop 2	Crop 3
Bank height minimum 40 cm	58	54	36

Sowing date 1st -15th October	13th Oct	25th Oct	26th Oct
Plant number 150-300/m <sup>2</sup>	275	125	277
Shoot number 600-1000/m <sup>2</sup>	699	576	1138
Topdress 50kgN/ha for 600-700 shoots/m <sup>2</sup>	52	29	0
Weed control rating good	Good	Poor	Good
Early pollen water depth minimum 20cm	26	7	10
Yield t/ha	11.5	7.5	3.0

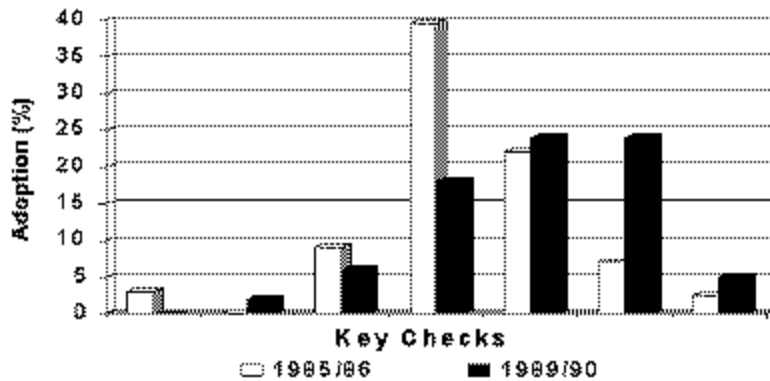
The crop checking of farmer paddocks distinguished high yields from lower yields and simple spreadsheet analysis allowed the key factors or checks linked to high yields to be identified as demonstrated in Table 2. A big selling point for the adoption of Ricecheck by farmers was a simple graph which showed that as more of the 7 key checks were achieved the higher the yield obtained (Figure 4). The graph was based on an average of 4 years data from farmer paddocks.



**Figure 4 The relationship between yield and number of checks achieved for the Murray Valley 1988 to 1991**

#### *Total Number Of Key Checks Achieved*

In 1989/90 a random crop checking survey of 136 crops was conducted to evaluate the adoption of the key checks. A mail survey was also sent to all farmers in the rice industry. The crop checking survey showed good adoption of Ricecheck and a significant improvement in the number of checks adopted (Figure 5). Of the 300 farmers who replied to the mail survey the answers given for yields increasing and percentage of replies were; improved management practices 23%, new varieties 20%, deep water 14%, weed control 14%, nitrogen topdressing 12%, layout 10% and sowing time 7%. Excluding varieties all these factors are components of the 7 key checks.



**Figure 5 Improvement in the % farmer adoption of the 7 key rice checks between 1985/86 and 1989/90**

Ricecheck is a developing process. Besides the 7 yield key checks which have been upgraded over time another 4 checks related to the environment and market quality have been added.

From my observations over the last 12 years I would assert that Ricecheck has changed the management behaviour of participants from minimal monitoring of the crop to closer observation where farmers actually step into rice bays to more closely observe, record, learn and analyse what is happening. The improved analysis and evaluation is a result of improved monitoring. Besides the changes in agronomic practices farmer attitudes, knowledge and learning skills have also improved.

#### Discussion Groups

Farmer discussion groups have played a key part in the delivery of Ricecheck. About 45 discussion groups are run by 7 District Agronomists. Many of these groups have been running for 12 years and continue to function(8). The momentum for the success of Ricecheck and the discussion groups has come from having a focus on the 7 key checks linked to yield. Farmers are encouraged to collaborate and learn from each other. This also allows them to influence changes to the Ricecheck management package and checks and develop ownership of the program.

All the Ricecheck discussion group meetings are held over a 12 month period and follow a learning cycle which involves the planning or setting of targets prior to planting, actions to improve management during crop growth, evaluation of the actions and identification of improved practices for the coming season.

A great aid to group learning are the comparative group reports where farmers can compare their own performance to the average and highest 25% yields (Appendix 1). Group reports stimulate a lot of discussion and provide a basis for a greater level of learning. The group reports are based on the records from about 650 paddocks per year.

#### Other check programs

##### *Subcheck*

My first use of the Check Approach for pastures and as a method of research was the Irrigated Subcheck Project(4). The project was set up to investigate a long term problem of irrigated subclover in the Riverina of reddening and poor and unreliable production. A volunteer group of 25 Finley farmers representing the dairy, fat lamb and beef cattle industries had a role in both providing paddocks and managing the project as part of a collaborative team. The other members of the team were NSW Agriculture and Pivot Limited.

The project was run for 3 years in 30 random subclover paddocks between 1992 to 1994. Small areas in the paddocks were fenced off from livestock. Production from each paddock was measured by taking 4 to 5 dry matter cuts per year. A number of other measurements and observations were also carried out. The results showed enormous production differences between paddocks for individual cuts, total production and between years. Analysis of the results through simple eyeballing determined 12 checks influencing subclover production. The major findings were:

- The better the adoption of the 12 key checks the better and more consistent the production
- Only 30% of the paddocks had consistent production from year to year with other paddocks being good one year and poor the next year. The checks explained this variation.
- Soil phosphorus levels were much lower than perceived. Phosphorus treatments added to the plots improved production by an average of 25%.
- Farmers had not adopted the long recommended watering practice of timing the second autumn watering 7 to 10 days after the first with the average gap being 19 days.
- Comparison of the fenced off area with the grazed area in winter found that hard grazing in combination with moisture stress, frosts and insect stress caused reddened clover and large reductions in dry matter.

During and following the 3 year project results were widely disseminated. Evaluation of the outcomes from Subcheck have shown that farmers have increased adoption of the key checks and improved subclover production as a result. Fewer farmers complain of up and down subclover growth.

### *Bizcheck*

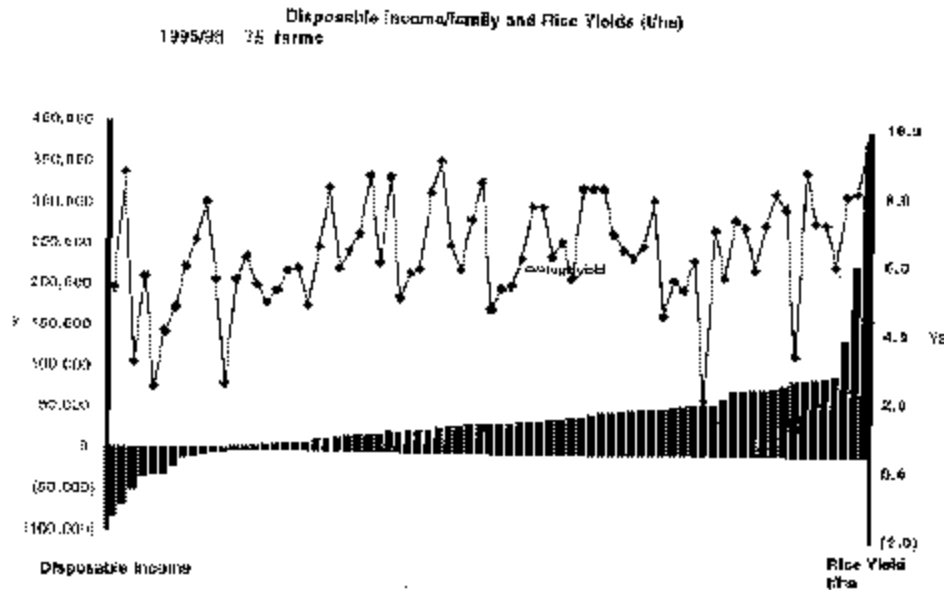
Bizcheck involves a new application of the Check Approach from individual paddock checking to whole farm checking. Instead of linking checks to yield Bizchecks links checks to farm profitability. Bizcheck enables farmers to determine their farm profitability and in so doing to gain an understanding of their business.

In 1994 the highest priority identified from 3 focus group meetings conducted in the Finley area was skills in financial and business management. It even rated higher than Ricecheck! I started looking for some financial benchmarks. Rob Rendell and Nigel McGuckian farm consultants from Bendigo in Victoria had been involved in many farm surveys assessing farm business performance. They developed the understanding in the early 1990's that there was more to increasing farm profits than just increasing yields and productivity (11). In 1994 we decided to work together to see if we could develop a business and financial package which identified the factors affecting profitability. Bizcheck follows the Check Approach concept. Features include:

- User friendliness to encourage active and easy participation by farmers.
- Six key checks linked to farm profitability.
- Minimal time input for collecting records. Bizchecks uses data from taxation returns which saves time and duplication.
- Comparison of profitability and checks with other farmers.
- Farmer feedback and learning encouraged at results meetings.

Bizcheck has found large differences in profitability between farmers in the same industry or district. It has also found there is more to lifting profits than just lifting productivity or yields. This is illustrated for the rice industry in Figure 6.





**Figure 6. A comparison of disposable income per family and corresponding rice yields for 1995/96 for 75 Murray Valley families.**

Bizcheck has been developed over the last 4 years. It was piloted in the rice industry and now has 75 farm families participating. Farmer participants have had a co-learning role with the developers and given useful feedback which has been utilised for the packaging of Bizcheck. Pilot projects have also been implemented with dryland mixed farmers at Temora/West Wyalong in NSW, dryland mixed farmers in Victoria, tomato farmers and dairy farmers in Victoria and in the citrus industry. Bizchecks is now at a stage where the presentation and packaging can be utilised for any group of family farmers or industries. At the time of writing this paper Bizchecks is being made available to grain farmers in Victoria and NSW through TOPCROP.

#### Concluding Remarks

The first part of the title of this paper was "Learning from Farmers". The key to the Check Approach and any successful extension programs are the farmers who willingly participate in sharing information and their experiences. In my work with farmers I am constantly impressed by their ability to produce new insights and knowledge. I have been meeting with some of my discussion groups for 12 years (12). At each round of my 10 groups there is no such thing as each group regurgitating the same old experiences. Invariably each group comes up with something new which is different to the other groups or a new way of looking at a problem. Thus groups can learn from other groups. Just imagine how much information or new ideas would be locked away if we did not have farmer groups? Whatever part the Check Approach has played in helping farmers, it is in giving farmers a reason for meeting together by providing a learning framework of checks or benchmarks which farmers can compare themselves with and with other farmers. An important part of the process is the feedback from farmers, researchers and advisers to ensure the checks are constantly updated and still relevant or added to in the light of new findings from farmer experiences or research.

The Check Approach is a learning cycle (2) and as with any learning should continue to evolve. We need to find better ways of collaborating and co-learning with farmers and continue to reflect on improved ways of observing, measuring, recording and interpreting farmer results and actions. There are opportunities with the advent of quality assurance programs for key productivity, environmental, financial and market quality checks to make up the components of quality assurance. It is really the Check Approach under another name. Benchmarking, crop checking or monitoring, call it what you will is the in thing to do at the moment. Maybe in 5 to 10 years time it will be under another name or we will do it

differently. The main point is to maintain and improve communication with farmers so we can continue to share information and learn from each other.

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