Chapter No: 3.

Case Study A: Extension Professionals

Case study A, involves eighteen extension professionals (Government and Private) in NSW and Victoria. Each extension officer was interviewed using the interview schedule shown in Appendix A. Interviewees were questioned in relation to the extension strategies used and the effectiveness.

Themes and sub-themes in the data were identified and noted within the responses of the participants. Analysis of the interviewee responses disclosed two main themes, extension strategies and perceptions. The extension strategies represent what the Extension Professionals (EPs) do; and perceptions are the opinions of EPs regarding the extension strategies in use. These themes are further divided into sub-themes, and are shown in the data analysis model (Fig.3.1). The main themes and sub themes are discussed and interpreted here in relation to their relevance to the effectiveness of extension practices of NSW and Victoria dairy professionals; interpreted through the action and perceptions of the of the EPs.

3.1. Extension Strategies

- 3.1.1. Group extension
- 3.1.2. One to one extension
- 3.1.3. Web-based extension
- 3.1.4. Mass media

3.2. Perceptions

- 3.2.1. Outcomes of the extension strategies
- 3.2.2. Future of the extension strategies
- 3.2.3. Strengths of the extension strategies
- 3.2.4. Weaknesses of the extension strategies
- 3.2.5. Evaluation of the extension strategies
- 3.2.6. Contraction and expansion in the extension services
- 3.2.7. Technological and management changes in the dairy industry
- 3.2.8. Advice to other extension professionals

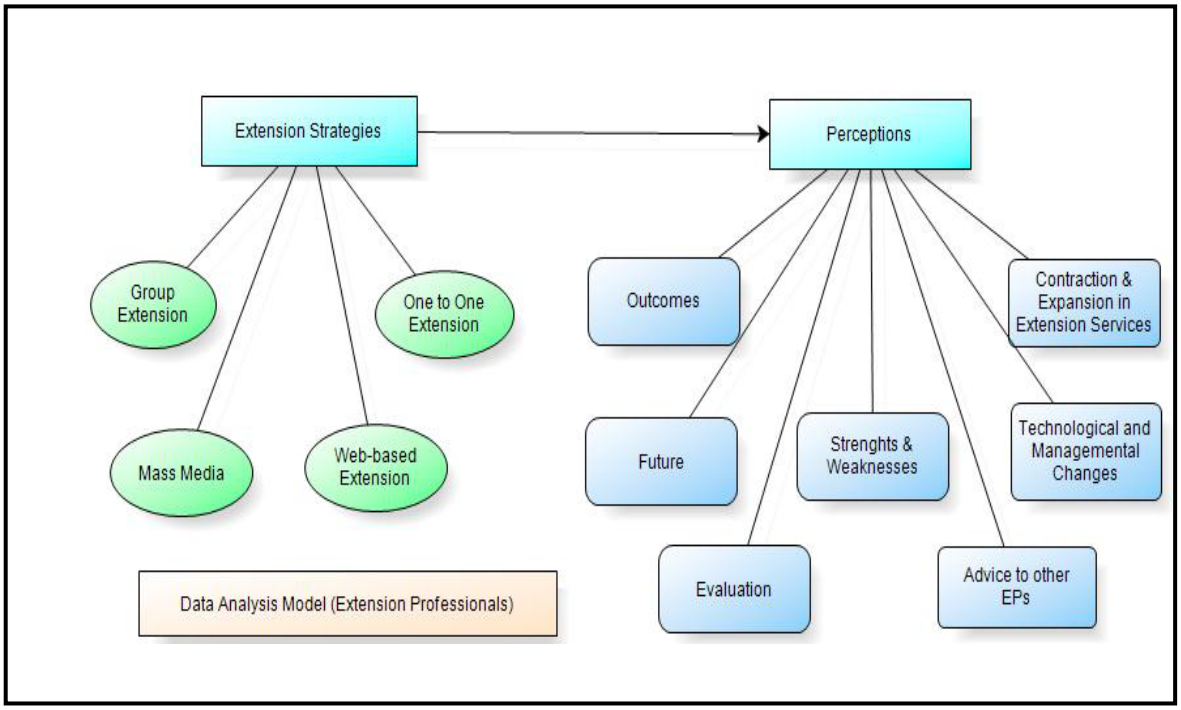

Figure 3.1: Data analysis model created from responses of Extension Professionals (relating to the extension strategies adopted, and perceptions regarding using the strategies).

3.1.Extension Strategies

Figure 3.2 shows the model representing the use of extension strategies by the EPs. The participants mentioned four major strategies, namely "group", "one to one", "mass media" and "web-based" extension. Group extension strategy was used by 15 of the participants in NSW and Victoria. The government extension professionals (GEPs) were in favour of group extension. However, except two, all the private extension professionals (PEPs) highlighted the concurrent use of group extension strategy along with one to one extension. Twelve EPs indicated that they were using a 'multiple approach' while using these extension strategies, and considered the key success of the in-use strategies as 'the engagement of farmers' in activities. The engagement of farmers is important, as several DFs in case study B (next chapter) highlighted this issue, and showed their interest in one to one extension. Interestingly, not a single GEP was practically using one to one extension in the multiple approach, as one-to-one extension require more recourses and time.

The 'multiple approach' includes the use of all the four strategies. This view of 'multiple approach' is explained in a response by one of the participants.

> *We use multiple methods, not one method, and that is the key to engage farmers, as no farmer is the same as another; and they have got different needs and different stages of development. So we apply multiple methods to get farmers interested, like, interactive groups, peer learning, but essentially we support farmers to make their own decisions based on good information and improved awareness. (NPV)*

This response from PEP's perspective reflects a rich description of using group extension as a primary strategy and then the other strategies for following-up as 'top-up'. The farmers' learning and development process starts from group extension and once they get stuck then they need one to one extension for further support. However, mass media and web base extension help farmers to get access to information of their choices.

Figure 3.2 further shows that one to one extension was only used by PEPs and not by GEPs. This does not mean that GEPs were not in favour of one to one extension, but it was found that they do not have the resources to use it. Like PEPs they also admit that one to one extension is the most effective strategy.

> *One to one extension is the best extension strategy, but we have to follow what we are told to do.....one to one extension is time consuming, and under the current resources we do not have time for this. (RGN)*

This quote reflects that one to one extension is believed to be effective but more time consuming than group extension, and the government or projects do not have enough resources to provide one to one consultations to individual farmer. The PEPs indicated that they adopt one to one strategy because farmers prefer one to one consultation in order to get direct solution to problems and they foresee the outcomes. Interestingly, farmers also expressed the same opinion. The responses show that comparatively, private extension providers are using more one to one extension than group extension. One of the PEPs indicated percentage of time allocation as, 60 percent of one to one extension, 20 percent group extension, and 20 percent co-operative consultancies, which is reflected in one of the response below.

> *Majority of our work is one to one let's say 60 percent, 20 percent will be group work (business groups and farmers groups), and the remaining will be with corporate clients. (JPV)*

Web-based extension - which includes websites, webinars, pod casts, wiki pages, blogs, emails, social media and even phones and texting - was considered an important strategy by five of the EPs. The participants mentioned that this strategy is very useful for farmers, this was also observed in case study B. In addition, this strategy is considered important for the capacity development of EPs and innovation for farmers. EPs indicated that capacity development is 'ongoing learning process' and useful for keeping EPs up to date. The EPs indicated that web-based extension is helping farmers to adopt new technologies according to their need. In contrast, farmers believe that for adoption of new technologies to occur, they need practical demonstrations of the value of the new technologies first.

> *We use developing website resources, podcast, tools templates, and downloadable information, which farmers can use and modify according to their need. (MGN)*

Keeping contact with the farmers, and reminding them what is happening in the industry is also considered as a good way for information transfer by the EPs. Participants explained that they have adopted new web-based extension strategies for information transfer for farmers. Participants indicated the use of email groups, mobile texting, blogs, face book and I-Phone/I-Pad applications, which includes calendar of events, short messaging services for farmers and service providers, feedback, discussion, and blogs etc. Such kinds of strategies were considered by EPs to be attractive for young farmers, and also as a good tool for feedback, experience-sharing or problem solving. Web-based extension was considered an effective strategy to bring the new generation into the farming business. The attraction of youth to dairy farming by web base extension will probably solve the main concern of DFs. This was highlighted by some comments of farmers that the new generation love technology, especially internet and phone, The introduction of computers and new 'smart' technology (explained in next chapter) will bring the youth back to farming business. Four of the EPs considered web-based extension as a good strategy for farmers and for EP networking. However, some of the EPs were interested in using social networking for information transfer, but they themselves were only basic users. They were also aware of the importance of new web base technologies and wished to build their own capacity before using these technologies

further. They added that this strategy is having a good future but need more research and funds for implementation.

Mass media was considered as an effective extension strategy by nine of the participants. It includes; newspapers, magazines, research articles, technical notes, radio or television, which are widely used across both the states by extension professionals. In addition to mass media informal education; trainings, seminars and conferences are also used. The EPs indicated that this strategy is helpful in providing a platform to share knowledge, disseminate new research findings and to obtained feedback of farmers and peers. Five of the EPs considered trainings, seminars and conferences as good adult learning tools. They added that farmers share their experiences (with other farmers and EPs), upgrade knowledge, and learn new things by attending trainings, seminars and conferences. The other advantage mentioned by one of the respondents was to give farmers an opportunity to discuss what is applicable in the field and what is not, which are reflected in the following responses:

> *We write a lot of tech notes, media and press releases, monthly or bi-monthly in the dairy Australia magazines. (FGV)*
>
> *We have forums and seminars, where farmers can discuss with experts what works and what not. (GGV)*

In contrast, some farmers believed that the facts and figures published in some magazines as overly technical and not necessarily practical. However, they acknowledge the importance of trainings, forums and seminars.

Improving coordination was considered an important part of mass media extension strategy by three EPs. They indicated that improving coordination was not only with farmers but all service providers in the field. This was considered as an important part of the strategy in order to develop linkages and reduce the burden of service provision. These EPs indicated that, due to lack of resources, it is difficult to reach or help every farmer, coordination with other stakeholders is necessary so that farmers are well served. They added that often research results are linked (with coordination of other stakeholders) and then shared with farmers for their information, this also helped in improving coordination with other stakeholders. Two responses highlighting the need for improving coordination are below.

We cannot deliver everything by ourselves anymore. So we work closely with local government with the resource management, we are working with, water providers, catchment management authorities and a lot of different organization. We coordinate with them and steer them in the right direction, which is better for the dairy industry in this region. (RGN)

We work with farmers as well as with service providers in the areas. We try to link the dairy research results with the farmers and service providers. (J2GV)

These responses reflect the coordination of different stakeholders. It is good for effective extension delivery from EPs point of view, but for farmers it is important to use dairy farmers' network groups for effective coordination. Curtis *et al,* (1999) also suggested that networks are important, and enhance the impact of groups by improving inter-group communication and 'pulling down' resources. The 'pulling down' of resources was described as looking for new information. It will help by uniting dairy farmers to cope with future challenges and issues and will enable farmers to set their own priorities and strategies.

In conclusion, the two major extension strategies used by EPs are group extension and one to one extension. It has been observed that group extension is growing rapidly and with wide application and acceptance in the industry. However, it has some major weaknesses, which are discussed in detail in the next sections. Therefore, for using group extension effectively, it needs to be used in conjunction with one to one extension in order to help the on-farm learning process of farmers. The importance of network groups and web-based extension is also highlighted for future use.

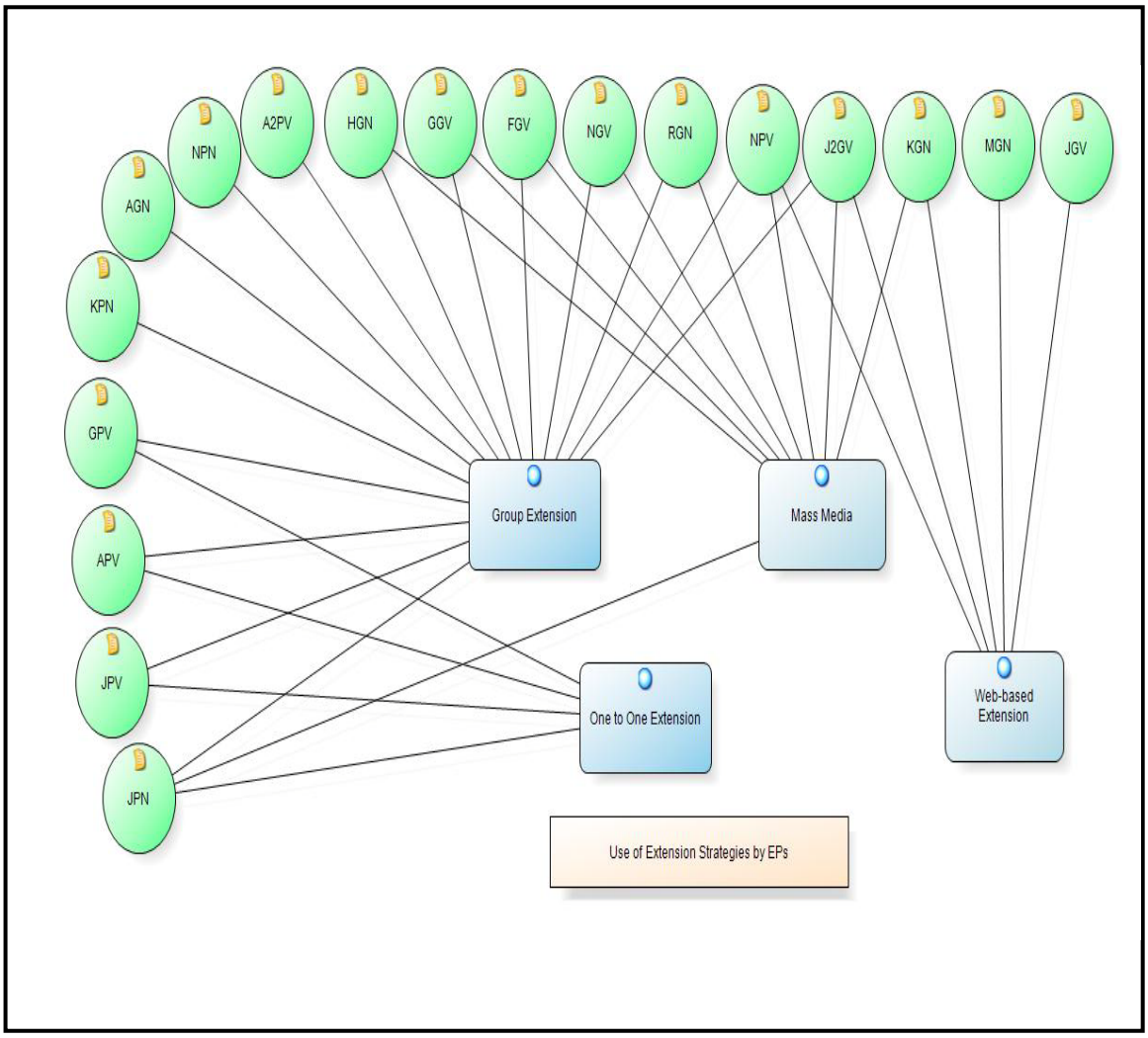

Figure 3.2: Model representing the use of four extension strategies by the participants. Each circle represents a participant, while the rectangles are the sub-themes.

3.2.Perceptions:

3.2.1. Outcomes of the extension strategies

Figure 3.3 illustrates the perceptions of EPs for desired outcomes of the extension strategies used. These were grouped into four categories; productivity and profitability, confidence building and decision making, learning and practice change, and applicable and practical. Eleven EPs highlighted learning and practice change as the desired outcome of the strategies used. The EPs believed that simply learning something, without involving practical application of learning, will have no impact on outcomes. Six EPs mentioned that these practice changes builds farmers' skills and confidence in decision making. The participants indicated that they believed that better decision making skills helped farmers improve productivity and profitability. They also stated that they do not want the farmers to quit the industry, and they wanted to help farmers to better manage their business, and to use resources more efficiently and effectively. From the responses, it seems that there is a strong belief that improving productivity and profitability would help farmers to reduce risk, obtain a 'life balance', and generally help in their decision making. Interestingly, the dairy farmers (DFs) also shared the same view (Case Study-B). Two EPs indicated that the outcomes of the extension strategies used should be 'applicable and practical'. This means that it should be easy for farmers to bring the theory into practice, according to their needs. However, one EP had no comments regarding the outcome of the extension strategies in-use, as he did not answer the question.

One private EP indicated that 'one to one extension' is the most applicable strategy, in that it achieves the most direct solutions to farmers' problems. However, the interesting finding was the government extension professionals still considered one-to-one extension an effective method, but also noted that there are some constraints to adopting this strategy, such as limited time and resource availability. It was perceived that the government project and agri-business driven services did not allow the government EPs to adopt only one to one extension strategy. The private extension providers stated that one to one extension is most relevant to private consultancies, and that the strategy provides flexibility, allowing adjustment of PEPs approach to cater for individual farmer's needs. The EPs indicated that they believe that farmers learn best from other

farmers, especially when they see theory in practice on other farmers' farms. Interestingly, this learning opportunity was also identified as important by the farmers.

The responses of the participants were interesting; some of these are quoted below:

> *Outcome really to me is, having farmers in a much better decision making environment. The good things about farmers are, they can now make better decisions, so they are aware of the different aspects of their business. (JPV)*
>
> *I guess basically change in management approach and impact on the business in terms of profitability is the main outcome. We are focused on client improvement and more profitable business. (GPV)*
>
> *There are different outcomes for different stages depending on where farmers are standing, like for some farmers this will be awareness, some will be improved understanding of where they are up to, for some will be improved knowledge. (NPN)*
>
> *The outcome is improving the knowledge of farmers regarding how they run their businesses. We focus on the farm profitability and strategies to reduce risk. (NPV)*

These responses reflected the perceived outcomes of EPs for the extension strategies in use are mostly focus on in learning and practice change, confidence building and decision making skills, applicable and practical, and to improve farm profitability and productivity. Another response from an EP highlighted the importance of one-to-one extension in achieving outcomes for farmers and for private consultants.

> *I have wondered for most of the years to find out the most effective way of change, and now I am absolutely convinced that the most effective way of change on the farming business is one to one extension. I think group extension is also good but the outcomes are mostly achieved by one to one extension. When you are doing business like ours (farm consultancies), then there is a strong market for this approach, and that's why we have focused on it. (JPV)*

This response also reflects the focus and strong market for one-to-one extension in private consultancies. This is perceived as a good strategy for achieving the desired outcomes.

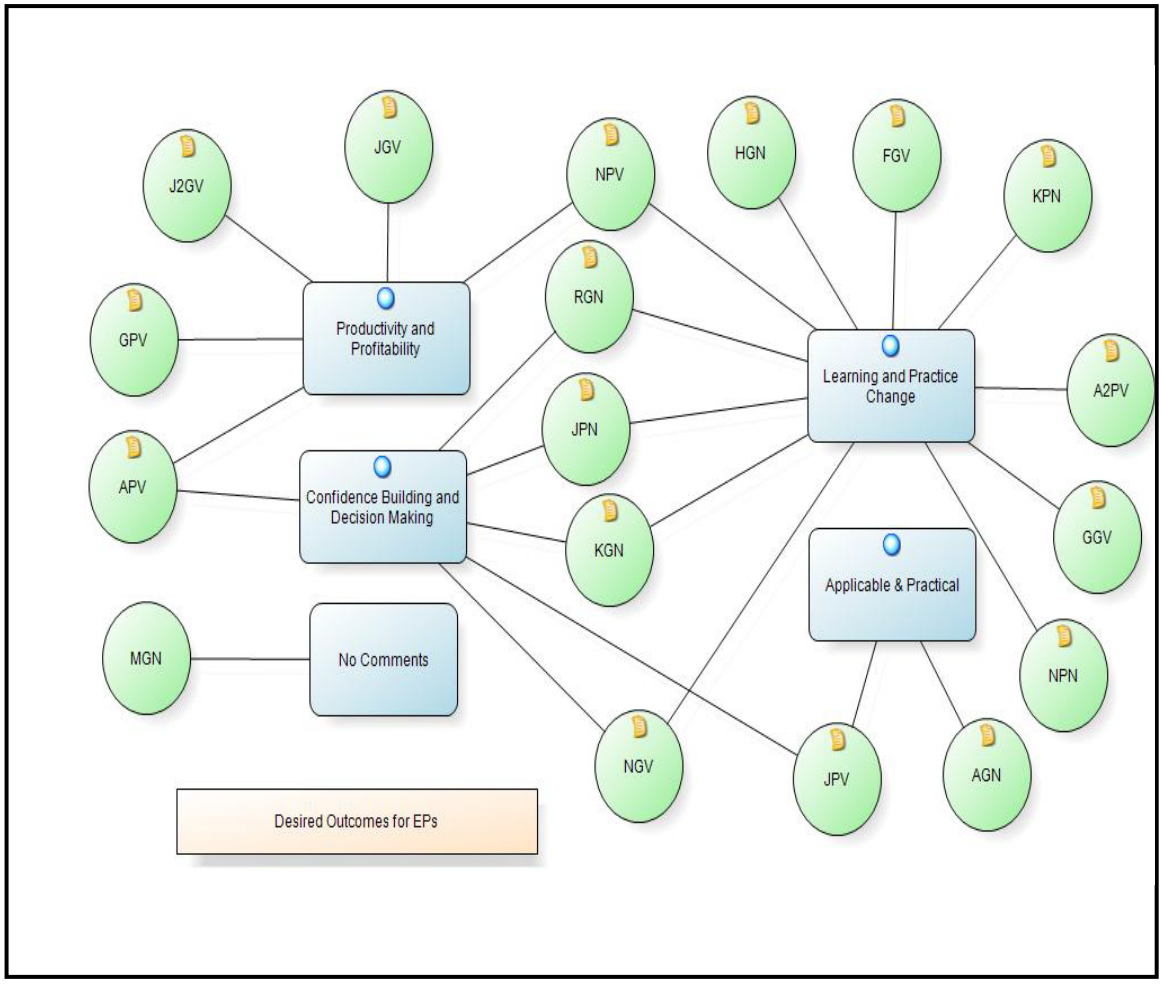

Figure 3.3: Model representing the perceptions of the EPs for desired outcomes of the extension strategies used. Each circle represents a participant, while the rectangles are the sub-themes.

3.2.2.Future of the extension strategies

Figure 3.4 shows that ten out of eighteen participants were optimistic about the future of extension strategies. These 10 participants indicated that they will adopt the current in-use strategies in future with slight changes if needed. The participants were confident that government and industry objectives to bring positive changes in the industry would be achieved through effective extension. Three of the participants indicated that, in future, they will work more on building networks with other departments, organizations or service providers. One focused on more contact with farmers than service providers in future. One participant related the future to be dependent on government or funds. One highlighted the importance of farmer training, and one indicated independency of dairy farmers as important for the future of the extension strategies used. However, only one participant was having no comments about future of the extension strategies.

Seven EPs indicated that, for the good use of extension strategies in future, it is important to ensure that farmers have adopted what they have learnt. This shows that the EPs required being in regular contact with farmers to ensure theory is translated into practice.

> *The future is for us to continue as guides and move away from individual farm (one to one extension). So we have to guide farmers and then to step back and allowed the farmers to do it with in their own local resources. (AGN)*

These 7 EPs indicated that they want to continue in their work, and were confident that farmers like these strategies by providing good feedback. Some of the optimistic responses from EPs are also quoted below.

> *Well we will continue to adopt as necessary, if these doesn't work we will adopt something new. (KPN)*
>
> *We will continue with these and will change them when needed. As every group of farmers is different, so we need to adjust our strategies according to the needs. (NPN)*
>
> *I think these strategies are very exciting and I haven't seen negative side of this so far. So we will keep going on with these. (APV)*

The responses of the participants reflect that the EPs are happy with the four strategies they are using. In future the EPs would carry on with these strategies with some slight changes. In general, the EPs perceived that extension and extension strategies are having good future across the two states and even throughout Australia.

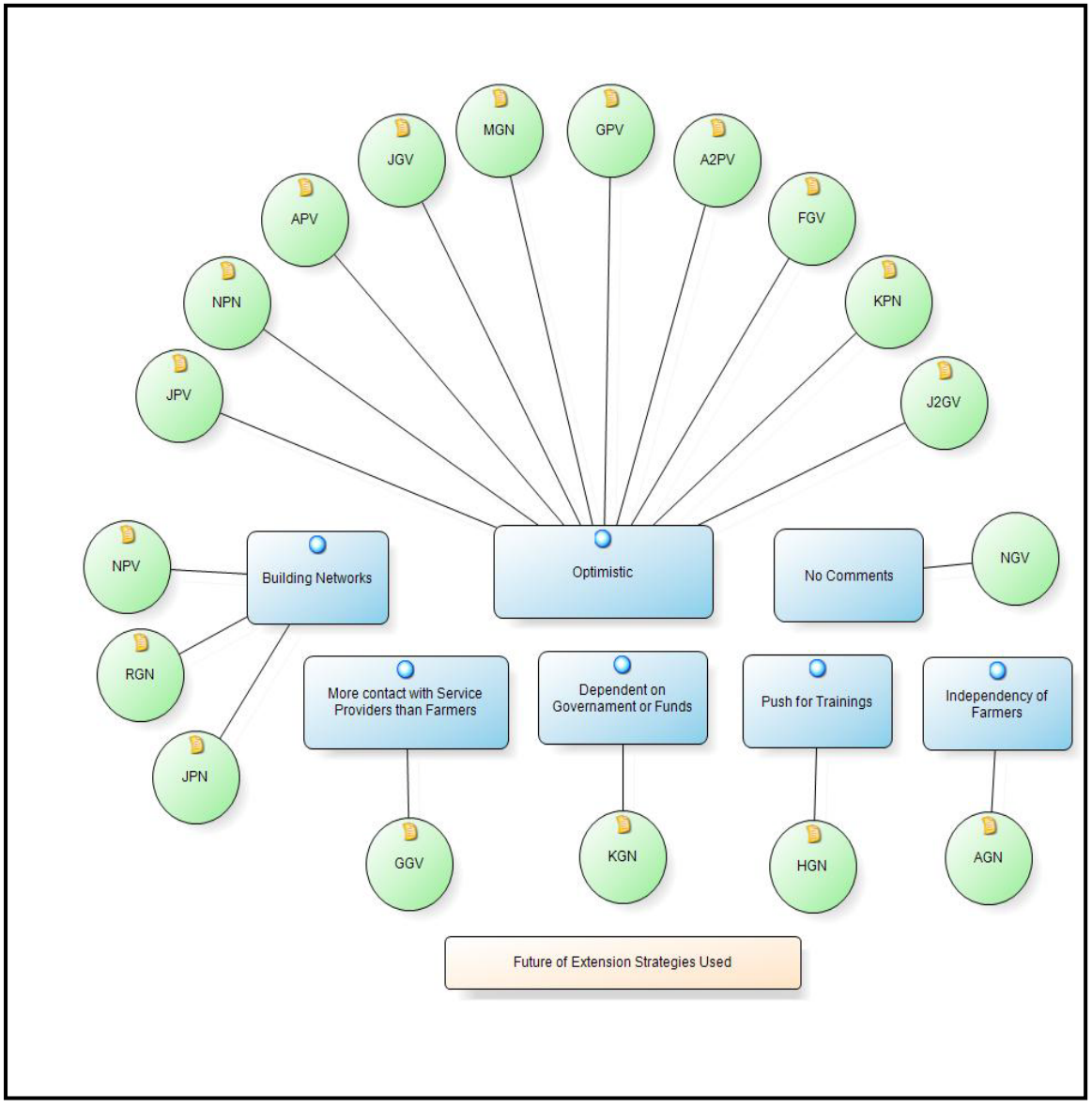

Figure 3.4: Model representing the perceptions of EPs of the future of the extension strategies used. Each circle represents a participant, while the rectangles are the sub-themes

3.2.3.Strengths of the extension strategies

Figure 3.5 shows the perceptions of participants regarding strength of extension strategies in-use, which were grouped into five sub-categories as; capacity and confidence building, practical and result oriented, working with and for the clients, participation, and linkages development.

Eight out of eighteen EPs indicated capacity and confidence building of farmers as the greatest strength of the extension strategies used. The EPs indicated that farmers have been facilitated to adopt on their farms the new technologies and practices provided through group and one to one extension strategies. Moreover, these strategies were considered to be helpful to farmers in adoption process, which can be modified by farmers according to their needs. They added that the extension strategies in-use is helpful for the farmers' learning and supported by adult learning processes. This helps in capacity building and improvement in farmers' capabilities and decision making skills. This, in turn, built farmers' confidence to bring theory in practice which is reflected in one of the responses below.

> *These strategies are taking people through the learning process and are supported by adult learning process, improve farmers' capabilities and decision making abilities and also give them confidence to implement in the field. (KGN)*

One EP indicated that, apart from DFs, EPs also benefit from the process. It was added that extension materials are developed and then shared with other extension professionals, resulting in their capacity building, as well as transfer to the farmers. These extension materials are usually technical notes and fact sheets relating to a particular extension activity. This was explained by one of the participants as follow:

> *Strength from the industry point of view is that someone prepare the course and the presenter get sort of training for that and prepare the training material….then everyone else have access to that. So it the most efficient way of development of extension materials. (HGN)*

Another eight EPs considered the strength of the extension strategies as to be their practicality and result-orientation. The EPs considered that the extension strategies brought theory into practice for farmers, and most innovations and changes are practically demonstrated on farms in field days, farmers' group discussion, farm walks, workshops, seminars and training courses. The EPs indicated that farmers learn theory and then apply it in the field, and also provide feedback to EPs for better use in future.

The EPs indicated that the feedback of farmers regarding the extension strategies used reflected that the extension strategies are result- oriented for farmers. Interestingly, seven of the eight EPs were from Victoria, who claimed that the strategies are effective and practical for farmers, because farmers like to see things in practice.

Three EPs indicated the strength of extension strategies used by them as working with and for the client and considered this as the key for success of agriculture extension. The EPs indicated that it is important to understand the client and their business; this understanding helps in building relationship with farmers, resulting in an increase in farmers' participation in extension events. One EP indicated that, if EPs have a good understanding of clients and their skills, it will help in giving relevant and valuable advice which will ultimately save consultation time.

It was observed that PEPs are more concerned about providing good valuable and effective advice to farmers. It seems there is a competition for market reputation among the private consultants by providing effective one-to-one extension to farmers. To achieve this, they are trying to provide better services to farmers on comparatively low rates. It was also observed that sometimes private consultants are also hired by the GEPs for help and support in some projects. This partnership also provides a basis for public-private partnership, and reflects current and future vision of agriculture extension in Australia where the involvement of private sector will be much more prominent, and the public extension service will work more hand-in-hand with agribusiness (Sheldrake, 1996).

Two EPs indicated the strength of extension strategies used by them as, participation of farmers in various activities and they commented that the participatory approach to extension helped farmers to actively participate in the extension activities. The participation was considered by the EPs as a good problem solving and experience sharing tool. They added that the farmers learn from each other's experiences, help other farmers and improve networking.

Finally, linkages developed with other partner organizations, departments, projects and service providers were also considered by one EP each as important strength of the extension strategies used. However, one EP had no comments regarding the strength of the extension strategies in-use, by not answering the question.

The overall strengths discussed in this theme highlight that the extension strategies are effective for farmers, and EPs are providing the best services within their capacity, while at the same time enhancing public-private partnerships.

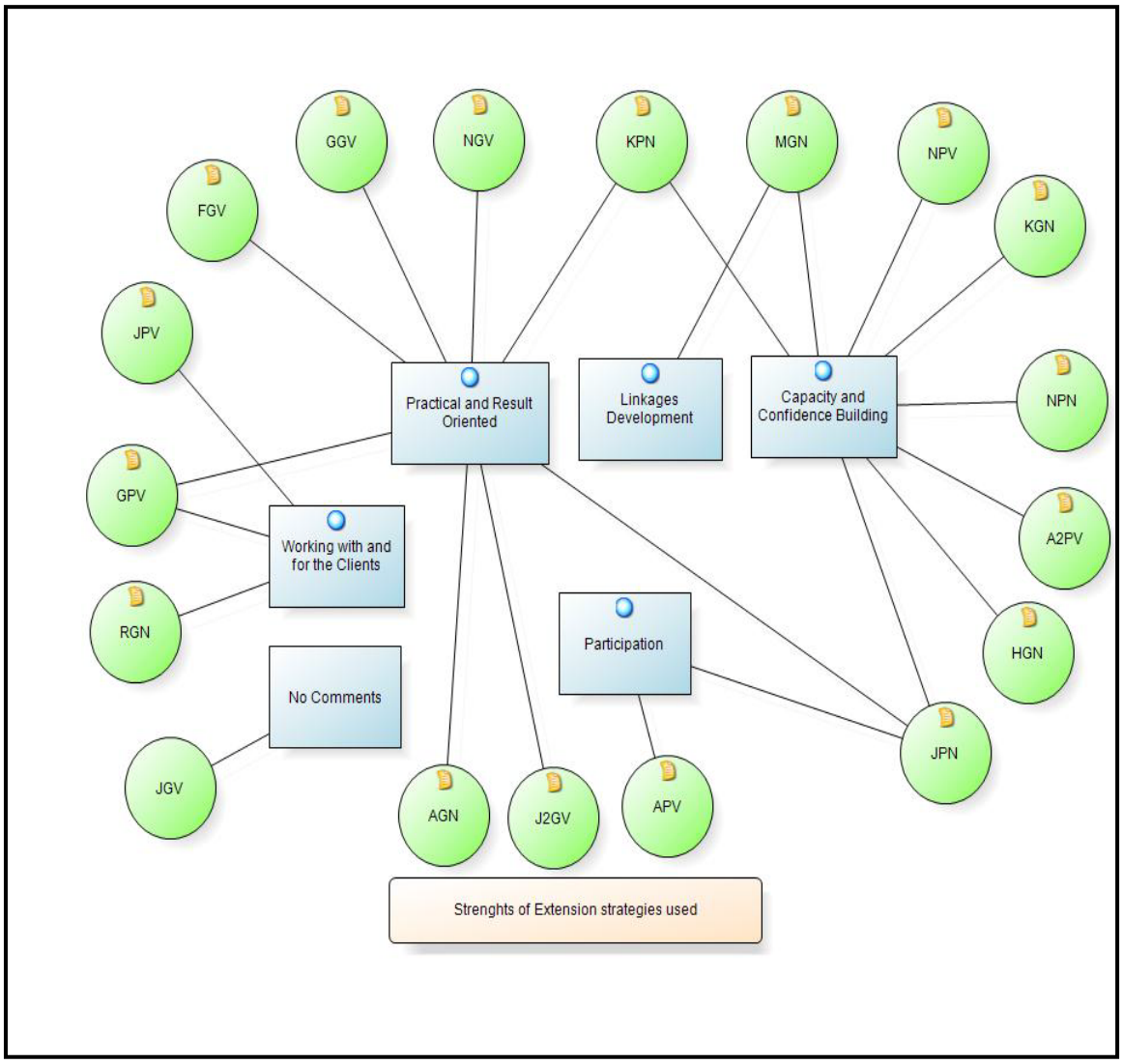

Figure 3.5: Model representing the perceptions of EPs to strength of the extension strategies used. Each circle represents a participant, while the rectangles are the sub-themes.

3.2.4. Weaknesses of the extension strategies

The data showed ten perceived weaknesses of the strategies used by EPs, which are illustrated in Figure 3.6. Seven EPs indicated lack of resources as the main weakness. The lack of resources was considered by the EPs in terms of limited training facilities, funds for activities and web-based extension facilities for farmers. Extension is an enabling change process for individuals, communities and industries (Vanclay and Leach, 2011) and the lack of resources affects the smooth flow of extension delivery for the enabling change. The lack of resources affects EPs salaries, recurrent support costs to cover transport, travel allowances, fuel, extension support material, and sufficient budgets for field extension activities; while the farmers are also adversely affected by inadequate service delivery. Another weakness indicated by two EPs was 'acknowledgements to partners or donors'. It was noted that sometimes projects are carried out in the interest of donors, rather than the interests of farmers, and reporting is done to meet donor requirements; this concern about project based extension has also been observed by some DFs in the next chapter. The lack of follow-up of activities or training was considered by two EPs as the main weakness of the extension strategies. They added that follow-up is necessary for implementing theory into practice. The lack of follow-up is directly related to lack of resources; if EPs had sufficient resources, they would effectively do the follow up. It was also observed that follow-up was regularly done by PEPs when compared with GEPs. This reflects the demand for increased extension services from farmers which they are mostly getting from PEPs. One of the participants (GEP) highlighted the importance of follow up in the response below;

> *One of the weaknesses of this strategy (group extension) we use is, you got to realize that you cannot develop effective leaders and somehow you need to look after them. (RGN)*

One EP indicated that, in some areas, information provided to farmers is irrelevant, which results in a lack of interest by farmers, and farmers consequently often consider most of the extension activities as irrelevant. In contrast, farmers consider the irrelevancy and authenticity issues to mass media and web base extension. However, farmers lose interest when they repeatedly see the same things in group activities. This loss of interest by farmers is mainly because of a saturation of particular information in extension activities, which was further identified by two EPs as one of the problems or

disadvantages in the provision of extension services. These EP's indicated that sometimes more than one department, project, or other extension services providers, offer the same knowledge or information to farmers at the same time. This makes the decision, as to which event to attend or which one will be best suited for them, difficult. This highlights the need for coordination and public-private partnerships.

There is a growing trend of public sector extension in the two states, specifically in Victoria and the development of 'coordinated extension approach' is needed for better organizing and value gains from this partnership (Vanclay and Leach, 2011). This approach will further help farmers in understanding the wide range of cross departmental extension provision.

One EP indicated that farmers are usually geographically far from each other, so sometime it is difficult to bring the farmers l together at short notice. The geographical spread of farmers', also results in low attendance at extension activities; however, it was observed by both EPs and DFs that web base extension is help to solve this issue. It was found that most of the participants use web-based extension for obtaining information within state, across the states or across the country. One EP mentioned that sometimes farmers consider EPs to have a solution for every problem, but the EP believed that EPs are not 'specialists' and able to solve every problem. The EPs suggested other extension professionals should work in coordination with farmers to help in solving their problems. This reflects the 'coordinated extension approach' explained in the previous sub-theme, this helps in experience sharing and problems solving.

One EP indicated the dependency of farmers on EPs as a major weakness, and added that sometimes farmers do not do things on their own but rather wait for EPs to suggest what to do. This dependency also results in a lack of confidence by farmers and poor decision making skills. Another EP indicated that some farmers do not appreciate or support of extension activities, and instead of taking appropriate messages home they are simply critical of what is available. Finally two EPs had no comments on the weaknesses of the extension strategies in-use by not answering the question.

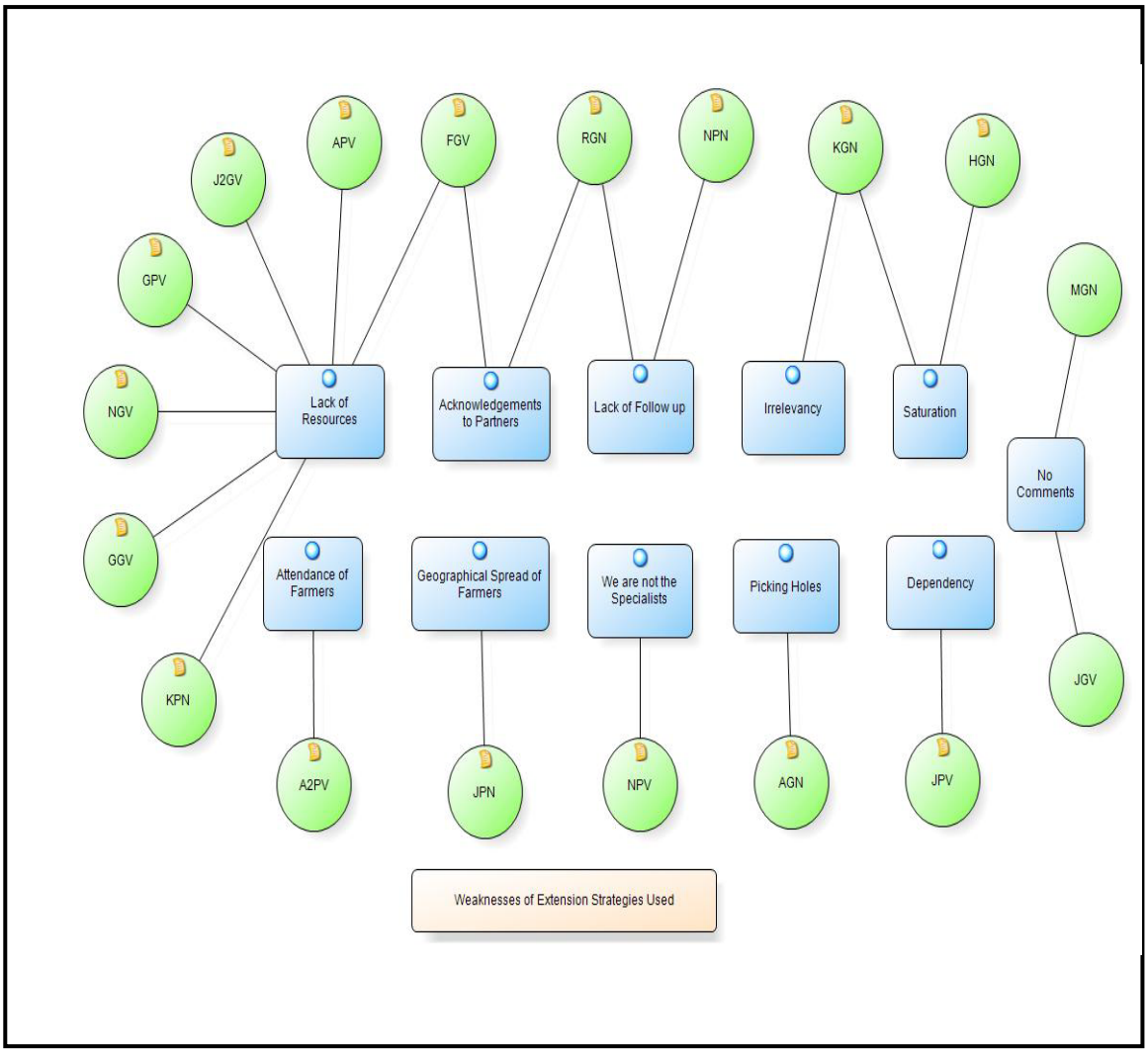

Figure 3.6: Model representing the perceptions of EPs of weaknesses of the extension strategies used. Each circle represents a participant, while the rectangles are the sub-themes.

3.2.5. Evaluation of the extension strategies

Figure 3.7 shows the perceptions of EPs regarding evaluation of the extension strategies used. Seven EPs indicated that they have been using the help of other professionals, organizations or universities for external evaluation. The EPs mentioned that most of the evaluation has been done by the funding bodies such as Dairy Australia, the Department of Primary Industries, Industry and Investment (I & I). The EPs believed that external evaluation saves EPs time, as they know that someone will do the evaluation. They also added that external evaluation pushes EPs to work hard and efficiently. Some of the responses of EPs for the external evaluation are given below.

> *Usually people from another organization or from Universities do evaluation for us and we get copy of report. But I haven't done it personally. (HGN)*
>
> *DPI has done some evaluation for the projects we have done for them but internally we are not doing any evaluation. (A2PV)*
>
> *We pay others to do evaluation. (MGN)*

Seven EPs indicated the use of internal evaluation, and mentioned that the main aim of internal evaluation was to assess the profitability of farmers. The main indicators were considered to be client satisfaction and profitability, followed by practice change. The EPs indicated that 'we' evaluate ourself by seeing what farmers are doing after we trained them or told them. It was also mentioned that through this process 'we' (the EPs) came to know about our mistakes, so we do not make the same mistakes next time. Internal evaluation was considered to be a good tool for many extension professionals; and very helpful in finding out the best ways to do things more effectively. Some of the EPs responses for internal evaluation are:

> *We are pretty happy with the approach and strategies we are using. We have done evaluation recently on the average participants and found that, they are earning 3500 $ a year through implementing the project and that is taken in consideration of implementing changes we have recommended. (JGV)*
>
> *Yes we have* (done evaluation), *and the outcomes shows that farmers who attended our courses are making more money ….and all of these are documented. (J2GV)*
>
> *Yes the department does evaluation on the departmental basis and now looking at the new strategies. We also look at how many people actually doing what we have told them, what they have learnt, what are our mistakes, how to make it*

better so that more farmers put it into practice. Hence, the basic of the evaluation is how the program has been run. (FGV)

The responses reflect that with the help of evaluation the EPs can easily find that the strategies used are helpful for farmers or not. The farmer satisfaction in terms of their farm profitability is the basic tool for measuring the effectiveness of extension programs.

Feedback of farmers was considered to be a good evaluation tool by three of the EPs. They indicated that the farmers' responses and feedback is the quickest type of evaluation and farmers can better tell the EPs what they like and what they dislike. The 3 EPs added that farmers are honest in their opinions, and if they dislike anything they will give negative feedback and vice versa. This is reflected in the response below.

Evaluation is ongoing with clients. Our evaluation is client's satisfaction. If they don't like it then they will discontinue, but it is the other way. It is also a part of my development that I am always looking at, that how we are delivering the information and how it can be improved in future. (JPV)

Two EPs considered evaluation as a 'complex process' and really hard to evaluate the effectiveness of any extension strategy. Though these two PEPs have not done any proper evaluation yet, but thought they would be doing evaluation in future.

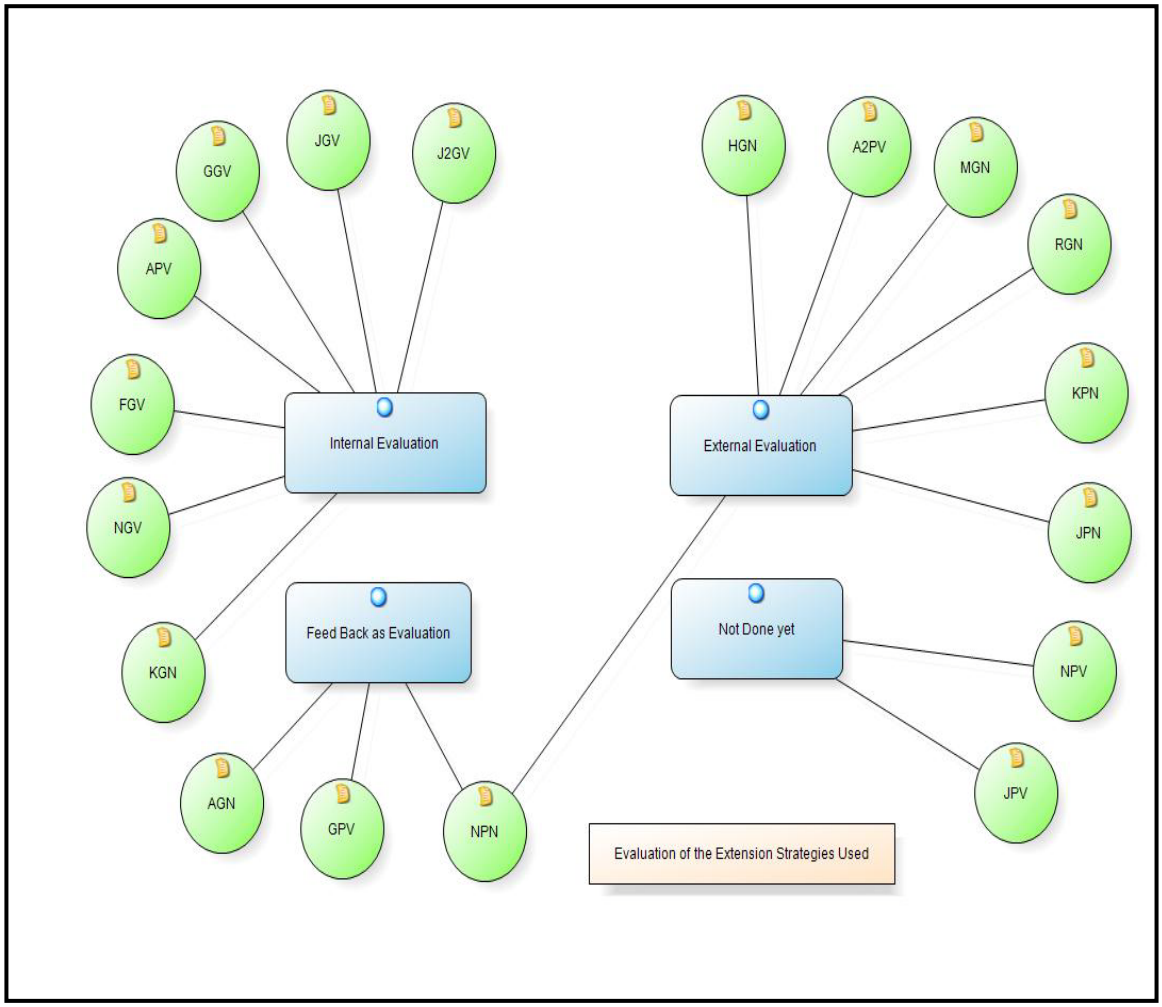

Figure 3.7: Model representing the perceptions of EPs to evaluation of the extension strategies used. Each circle represents a participant, while the rectangles are the sub-themes.

3.2.6.Contraction and expansion in the extension services

The question was asked if the dairy industry had changed in terms of contraction and expansion in extension services in the last 10 to 15 years. The participants' responses showed that there were contractions in extension services in NSW, while in Victoria the extension services were expanding.

The main reasons for contraction in NSW were found to be age crisis, deregulations, drought, funding, issues among departments, policies and priorities of government, and lack of staff, which results in cutting services. Ten EPs indicated that a lack of funds and changing policies of government as the main reasons for contraction in the extension services in NSW in the last 10 to 15 years. These EPs also mentioned that deregulation and political issues have affected the extension services in NSW. One of the participants indicated that there is an "age crisis", and there has no replacement for staff (EPs) retired or going to retire, so the department has been cutting staff. Another participant mentioned that the overlapping of extension activities among departments and organizations are causing contraction in extension services in NSW. One indicated that most of the services EPs used to offer are no longer offered, because of cutting down the activities and research facilities *"Some of the services we use to offer are now no longer offered"(KGN).* The EPs responses showed that, in the last 10 to 15 years, NSW extension services have experienced contraction, which has affected dairy farmers as well as extension professionals. Some responses of the participants regarding contraction of extension services and staff in NSW are stated below:

> *We have deregulations in the Australian dairy industry and probably lost 40 % of the dairy farmers in NSW, and I assume that is one reason why we have lost staff. (RGN)*
>
> *Government is now providing less funding, so we have been cutting staff numbers and cutting functions. (KGN)*
>
> *I think NSW government wants to pull money out of extension now. (KPN)*
>
> *I think some political issues are associated with it, agriculture probably have had to be re-adjusted in terms of priority for government, there is little bit of shift in terms of where the government puts the money into agriculture and into the government department. (MGN)*

The participants' responses regarding the reasons for the expansion of extension services in Victoria were based on, Victoria is now seen as a dairy hub and centre for dairy research and extension in Australia; better share in the milk market economy and export; interest of private services and companies; and the Victorian farmers paying levies and then having access to their levies resulting in increased extension funding and extension staff. Fourteen EPs indicated that availability of fund; staff and Victoria as a dairy hub in Australia are the main reasons for expansion of extension services in Victoria, while four EPs had no comments regarding the reasons for the expansion or contraction of extension services in either state. Some of the responses of the participants regarding expansion of extension services in Victoria are below:

> *Extension in Victoria is expanding, by having more funds, programs and projects. (JPN)*
>
> *There are also lots of funding to projects in Victoria because it the hub of dairy in Australia. (GGV)*
>
> *Victoria is been the centre for dairy research and extension, funding comes from the government and also from dairy Australia and the number of other sources. So we have good support here in terms of funding. While I don't think such is a case in NSW or in any other state. (J2GV)*
>
> *Victoria is the dairy hub of Australia and having plenty funding for different dairy projects (30-30 project, future dairy, different pasture projects, Project 2012, etc) mostly funded by Dairy Australia. (NPV)*

The responses showed that mainly funding, and the changing interests and priorities of government were driving the expansion or contraction of extension services across both the states. There were some other factors indicated as well (discussed before) that cause expansion or contraction in the extension services. However it was indicated by the EPs that technology and information transfer is a diffusion process, and hence diffuse from one state to other, one area to another, or one farmer to another farmer. However, interstate and inter-area diffusion may be a slow process. In addition, it was also observed that EPs and DFs have good networks for information sharing, so communication could play a major role.

3.2.7.Technological and management changes in the dairy industry:

EPs highlighted a number of technological and management changes in the dairy industry in the last 10-15 years. These are discussed below**.**

3.2.7.1. Significant Changes in the dairy industry

Twelve out of eighteen EPs considered nutrition and feeding and milking technologies as the most important changes in the industry in the last decade. The EPs indicated that feeding patterns, grazing management, and the use of grains and total mixed rations has improved, over time resulting in the improved productivity and profitability of farms. They added that land management and pasture grazing and management had also improved, because farmers considered this their top priority. Since 1991–92, there has been a gradual upward trend in the quantity of concentrates, grain and by-products fed per cow (ABARE, 2008). The improvement in the feed and feeding systems by the dairy farmers across both the states has resulted in improved milk production. Ashton & Mackinnon (2008) reported that most dairy farmers pointed out that feeding concentrates, grains and by-products has resulted in an increase in herd milk yield and a higher milk yield per animal. Some of the participants' responses affirm this:

> *Probably feed and feeding systems, the use of grains which has improved production significantly. (A2PV)*

> *There are fair changes in feeding like total mixed ration and partially mixed ration and feeding patterns. (HGN)*

Changes in the milking technologies were also considered as one of the important changes in the dairy industry in the last decade. Twelve EPs indicated that the numbers of farms had decreased, but the numbers of animals per farm had increased in the last two decades. These changes have created the need for improving the milking technologies and introduction of robotics in the industry. During 1991-92 to 2006-07, the number of Australian Dairy farms declined by one third, but milk production increased by 42 % in the same period. This increase was associated with an increase in the total number of cows and also in average milk production per cow (Ashton & Mackinnon, 2008). The improvement in the milking technologies is one of the major significant technological advances in the dairy industry. These participants indicated that the introduction of robotics and computerized milking and feeding systems are helping in overcoming labour problems, which is one of the main problems in the dairy industry.

I think it is the use of automatic cup removers, automatic drafting gates, use of computerized cow identification that allows computerized feeding of cows. All these things have allowed farmers to milk more cows per person and improve productivity in terms of labour perspective. (NGV)

Nine EPs indicated that there has been phenomenal improvement in terms of finance and record management as well as computers and computer operated programs related to dairy sector. It was anticipated by the EPs that computers and computer operated programs were helping farmers in managing their farms in operations as well as in terms of management and record keepings. It has been observed that the industry has improved in the last 10 to 15 years in terms of computer operated programs. This was largely associated with use of new technologies such as milk harvesting, farm management practices including the improvement in the cultivation and harvesting methods of pastures and fodder, along with an increase in the use of grains and concentrates, which resulted in productivity growth (ABARE, 2005).

The improvement are, the use of computers on farms but from a general industry perspective, I think it is the use automatic cup removers, automatic drafting gates, use of computerized cow identification that allows computerized feeding of cows. (JGV)

The IT side has changed a lot, in terms of computers at home or computers programs for mating or feeding cows (FGV)

These responses reflect the introduction of information technology, especially computers and computer-operated machines in the industry. The farmers are now using these technologies for operating their farms.

Some of the other significant changes in the dairy industry mentioned by the participants were; changes in farm size were considered as good for the overall growth of the industry. Changes in irrigation policies have stabilized water use efficiency; information and communication have improved the farming business and networking with other people in the industry. Some of the other significant changes mentioned by EPs were improved milk production, farmers' adaptation to climate change, proper calf management, improved animal health and modern dairy sheds. According to Aston and Mackinnon (2008), dairy farmers received a variety of training including addressing issues of herd nutrition, pasture management, concentrate & feed management, soils &

fertilizers, computer skills, milk quality management, business management, fodder conservation, herd management, and people management & employment, etc. Such training has resulted in the significant technological and managemental changes in the industry.

3.2.7.2. Catalyst or Drivers of Change for the Dairy Industry

Figure 3.8 shows the perceptions of the EPs regarding catalysts or drivers of change in the dairy industry over the last 10 to 15 Years. EPs indicated that these drivers of change were: milk and commodity prices, profit and productivity, climate and environment, extension providers, labour, water and irrigation, deregulation, increase in herd size, and decrease in farm numbers, which are discussed below.

Six EPs believed that milk and commodity prices and profit and productivity of farmers were the main drivers of future change. The EPs indicated that increased prices of inputs and comparative low price of milk has affected the dairy industry. It has been observed that the increased prices of inputs resulted in low profitability and hence farmers start leaving dairy farming, and getting into other businesses. It was also perceived that the profit margin has decreased which has been affecting productivity, and resulting in decreases in income verses expenditure. The EPs indicated that the milk and input prices are playing a major role in the farm profitability and dairy farming future.

> *Financially the catalysts are milk prices and commodity prices, as in past the farmers have been in a pretty good cash flow position, if we look at their bank balance. (AGN)*
>
> *Milk prices is the main driver, you need a good milk price to make living. The cost of input is really driving the changes in the industry. (J2GV)*
>
> *Probably declining margins and profitability are the economic drivers. (JPN)*
>
> *I think the catalyst or the drivers of change are reduction in price "The price squeeze" and rate of return. (JGV)*

Four EPs indicated that the climate and environment as important drivers of change, and this had put pressure on the government, as well as on the producers, to plan for the issues of climate change. Environmental factors, like drought and floods had affected the dairy farmers in the last two of decades. However it was felt that a proposed carbon tax would affect the industry in future. Three participants mentioned extension providers as

drivers of future change, two indicated water and irrigation and labour and deregulation. The two EPs realised that Australia being the driest continent and the decline in the availability of water has presented the need for water and irrigation policies. The sustainable management of water use has been a hot debate among political parties recently; this resulted in new water policies like 'Murray Darling Basin'. The two EPs were having concerns that such policies and shortage of skilled labour may affect dairy farmers in future.

One indicated that increase in herd size and decrease in farm numbers, as the drivers of change for the dairy industry. Two participants mentioned other factors, such as 'land prices', increase in which result farmers in quitting dairy farming and starting another business as they get good price for their land. These participants further mentioned 'competition to resources', and 'changes to the adoption of technologies' as the farmers are competing in maximum utilization of the resources with the help of technologies. However one participant had no comments, by not responding to the question. One of the participant's response reflected high land prices and farmers leaving the industry and getting into other businesses.

> *High land prices on the coast, so when the farmers decides that they don't want to do dairy farming any more so they get good return by selling their land.*
> (KGN)

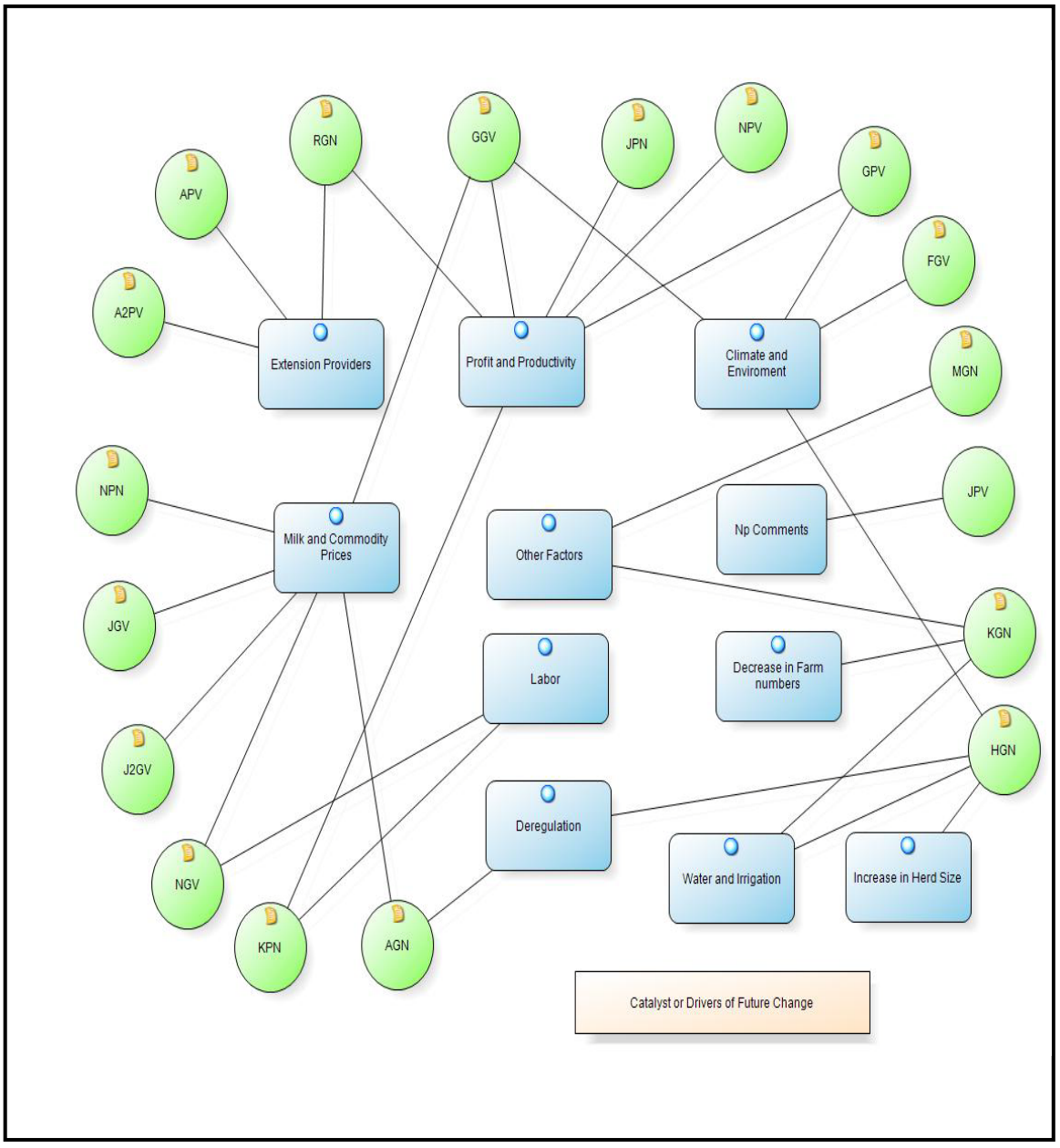

Figure 3.8: Model representing the perceptions of EPs to catalysts or drivers of future change. Each circle represents a participant, while the rectangles are the sub-themes.

3.2.7.3.Role of Extension Education

Figure 3.9 represents the perceptions of EPs regarding the role of Extension Education in initiating and facilitating technological and management changes in the dairy industry over the last 10 to 15 Years. The participants responses were grouped into the following themes; awareness and information, extension as a change agent, bridging research and farmers, linkages development, transfer of modern or new technologies, business development, identifying and then solving problems, ready to face challenges and helping policy makers.

Ten EPs considered extension as important for awareness raising and providing new and up to date information to farmers. The EPs were confident that they are helping farmers in building their capacity and skills. This skill and capacity development of farmers' resulted in improved farm productivity. They further added that extension education is *"The Vehicle of information for farmers"* and a source of provision of technical as well as general information to farmers. In addition farmers not only use EPs for obtaining information, but also use other extension resources like web based, print and electronic media on regular basis.

> *I supposed that extension education try to give farmers technical information and bring it in practice. We are helping farmers to run their business properly and also link them with other service providers…. In somehow we are opening eyes of the farmers and giving the tools, recipes and a whole range of awareness. We hope that farmers will pick it up, take it on board, and make something out of it. (FGV)*

> *Extension education plays a key role, success in farming would not be possible without extension education….extension is a vehicle to information for farmers. (NPN)*

The responses reflect the bridging role of extension for linkage development among farmers, EPs and research organizations. Effective extension attempts to produce well-informed farmers with better productivity and profitability.

Four EPs indicated that generally farmers are very busy, and they have many other things to do on their farms, so they hardly find time to do research or look for information they need. If they do, it consumes a lot of time for them to get to the required information. However, most of the available information is technical, and farmers need to understand it first before applying it in the field. Therefore, there is a need to identify 'what works

and why' in the relationship between farmers, EPs and research. This concept is also mentioned in 'consultant or mentor model' (Coutts et al, 2005). This model describes the technical support of expert visiting farmers, providing advice, advice diagnosis and recommendations. This can be short term or on-going, therefore this illustrate the importance of follow-up, which builds farmers' capacity and important for proper adoption of new technologies. Interestingly, the importance of 'follow up' was also identified by farmers, which further explained in the next chapter. Hence EPs play an important role in transferring information in easy and understandable ways, and helping farmers to understand new technologies and effectively adopting these technologies.

> *We play a key role, as I said farmers are pretty time bond and generally (I don't want to say this for degrading our farmers) farmers have low level of education. They are not often active information seekers, or to be able to interpret a lot of scientific information. So our key role has been to be able to interpret new information to support farmers to change. I think, without extension there would be much slower rate of change. (KGN)*

> *Extension education is helping farmers to manage whole farming process. I think (recently) dairy farming has become much more complicated and extension education has played the role in helping farmers to manage different aspects. (J2GV)*

These responses reflect the supportive role of extension for farmers' adoption process. The technical information is converted by EPs to take-home messages to develop better understanding by farmers. While in case study of farmers (Chapter 4), it has been observed that most of the farmers want extension to be practical presenting theory in practice. These concerns of DFs were mostly regarding mass media extension and few for EPs, which will be examine in detail in the next chapter. The farmers needs have been related to specific problem based learning. However, the specific needs for individual farmer could be better solved by one to one consultation while the group extension is mostly about general problems.

Four EPs indicated that extension education is 'a process of change' and helps in initiating and facilitating changes in the dairy industry. They added that extension education has played a key role as a "lead change agent" and it has changed various traditional approaches in the industry. It has also encouraged farmers to adopt new technologies and helped the farmers in implementation. It was observed that extension helps the introduction of new technologies and new findings, and then links farmers to

the new information. This concept was also highlighted by Coutts et al, (2005) in his fourth extension model for capacity building, which they termed 'information access model'. In this process the farmers needs are identified first, then farmers are provided with range of relevant information that they can access at a time that suits them. It can be based in a library, information centre, on a website, or other centralised location.

> *Extension education is supportive change; it has also changed the traditional approach and management approach. It has challenged farmers how to achieve goals and helped farmers how to apply different management changes. (GPV)*

Bridging research was also considered by EPs as important for extension education. Bridging research was considered as the transfer of research findings from research institutions to farmers and then bringing the feedback from farmers to research institutions. Three EPs indicated that extension education has linked farmers with each other and with service providers to improve their businesses. EPs also indicated that the role of extension education in disseminating research is very important. The EPs believed that extension education and research had been hand in hand, and the findings of the research institutions were delivered effectively to the beneficiaries. The EPs also pointed out that they play important role within the industry, while helping the industry as well as farmers in improving their business. It was perceived that EPs are facilitators of adult education and engage farmers in a variety of activities, especially friendly competition. These competitions help farmers to understand the theory and then bring it into practice efficiently. Extension education was considered by the EPs to be important for bridging research, industry and farmers. One of the responses is quoted below.

> *All the good things in the research will not be able to be in the market without extension. Researchers are generally not really good in selling their product, or getting their message across. They do a lot of research work, but then they also struggle to take that out to the industry or farmers. The research might be based in the university or institution, but they generally don't have the budget or recourses to get that information out to the farmers. So I think extension education employs the key role in this process. (KGN)*

A traditional view of extension as dissemination of knowledge is reflected in the above quote, where extension has been considered as the marketing tool for the researcher and the extension professional the salesman. However, research is not effective unless farmers bring it into practice and the farmers' as end users could provide better feedback to the researcher through extension providers. However, recent literature shows that the

focus of extension is now recognised or involving capacity building and community engagement. The extension is now mostly about process of enabling change in individuals, communities and industries involved with the primary industry sector and with natural resource management (Vanclay and Leach, 2011). Extension has also been termed as an 'effective policy instrument' by these authors and they considered partial assurance to funding the capacity development of EPs in order to bring the desired changes.

Identifying and then solving problems, along with implementation of new and modern technologies, were mentioned by three EPs, and considered as playing key role for farmers' education. It was also indicated that farmers get updated information through extension education for adoption of new and modern technologies. It was perceived that 'we', (EPs) facilitate farmers in various implementation stages, and suggest the best possible and applicable technologies for them. This shows the cooperation and support of EPs to farmers', even in the implementation phase. This support was further observed by the practical demonstration in the group base activities, like field days, farm walks, and informal on-farm trainings. This reflects that follow up is done by these three PEPs; however, from most of GEPs it has been observed that they did not have enough resources for follow-up activities.

> *Identifying problems and then solving them, is what extension doing and that is the key role for educating farmers in terms of new technology and techniques. (APV)*
>
> *I think from our own perspective what we do is helping and facilitating the implementation of new technologies. We help farmers and we practically show them implementing the new technologies, and how these will fit into their farming businesses. (NPV)*

These responses reflect two different views of extension, problem solving and technology transfer. The EPs are aware that farmers are always hungry for practical information, once they see theory in practice then it is easy for them to adopt on their farm. These two views seem to be compatible, as once the farmers get solutions for their problems and then they are willing to adopt new technologies easily.

It has been observed that extension education helps farmers to get prepared to face future challenges, plan and act according to the situations. EPs are providing moral as well as physical support to farmers, now it is up to farmers, how quick and effectively they adopt

it. The above-mentioned sub-themes from the participants' responses showed that research institutions, industry and farmers cannot progress without proper extension education programs. EPs indicated that strong linkages are necessary for the information flow among the mentioned themes. However, extension professionals act as 'change agents' in the whole process.

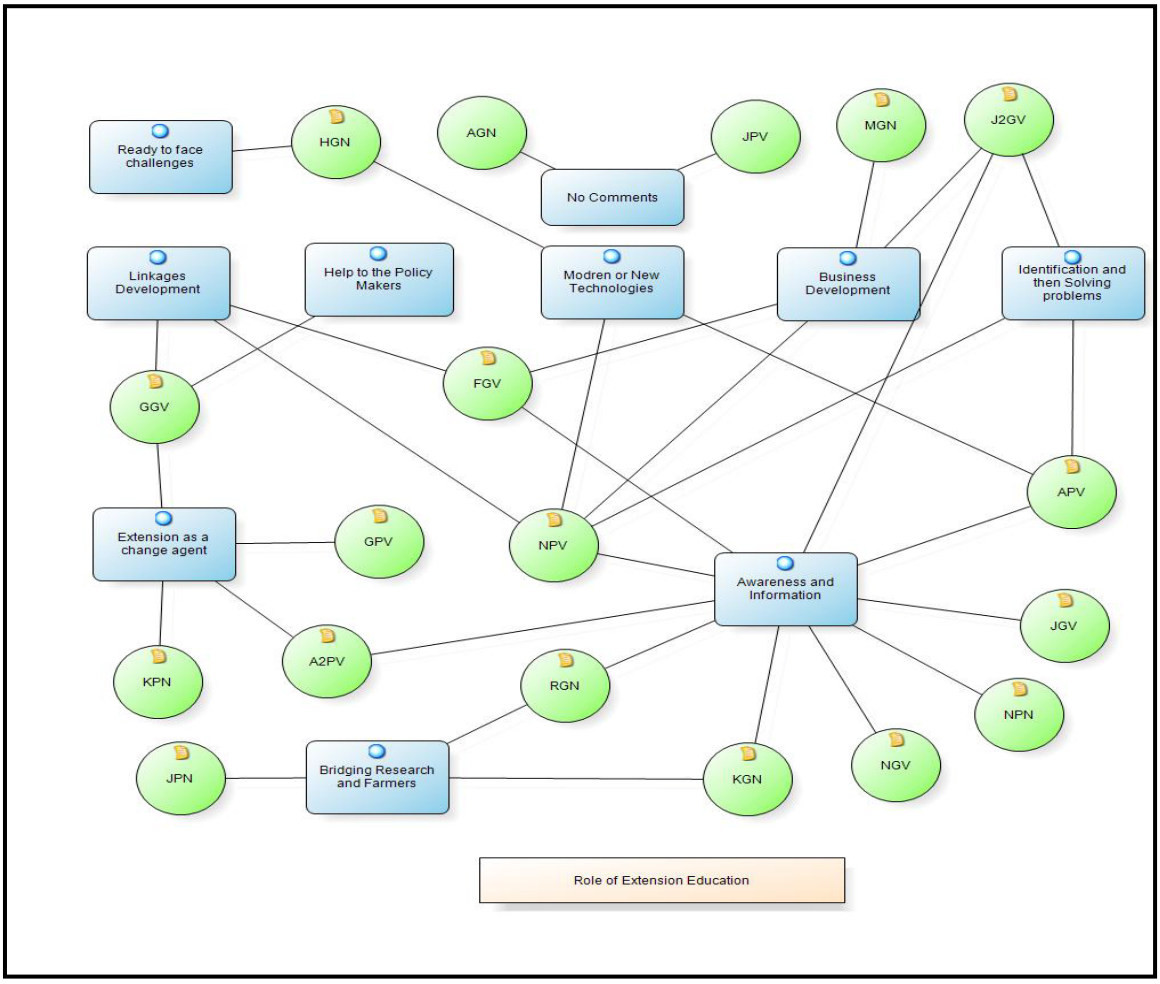

Figure 3.9: Figure representing the perceptions of EPs to the role of extension education in disseminating new technologies. Each circle represents a participant, while the rectangles are the sub-themes.

3.2.8.Advice to other extension professionals

At the end of the interviews, participants were asked what advice they would offer to other extension professionals for using extension strategies effectively. As shown in Figure 3.10, most of the EPs (five each) suggested team work, sharing knowledge, and providing relevant information to be the main focus of extension professionals. They believed that this helps in keeping the EPs own knowledge up to date, and in capacity building of farmers. The knowledge of farmers individual circumstances, needs and goals and the use of proper and effective information are also considered as important tool. The EPs indicated that extension professionals need to understand the needs of the farmers, and how to improve their business by providing relevant information. However, good relationships and regular contact with farmers were also considered to be important by EPs. Some of the suggestions of the EPs to fellow EPs were as follows.

> *Do not overload the clients with too much information; just let them focus on the important stuff. The important thing is you will not be a good consultant if you do not understand the client business. (NPV)*
>
> *I think extension professionals have got to have a very strong understanding, not only at the technical aspects of the area they are working in but also in learning development and facilitation. So my advice to extension professionals is to be fully aware not only of the technical aspects of the area but also about the background knowledge. (MGN)*
>
> *The more you encourage team work and group participation, the less your individual performance tends to stand out. (RGN)*
>
> *I think the messages needs to be very clear and simple; you need to be careful that it shouldn't be too technical for the farmers. Most of research work is technical and that need to be broken down to take home messages. If we can have information or learning in field days that farmers can take home then I think it is effective and we will achieve what we want. (A2PV)*

Two EPs suggested that extension professionals need to be trustworthy and provide effective information to farmers. They added that gaining farmers' trust is important for the effective delivery of extension messages. Three EPs suggested that EPs need to plan the extension activates properly, because these events provide a learning environment for farmers. Three other EPs suggested that other EPs should try new things during their work. It was suggested that farmers need to be treated like a family members, and then messages passed across to farmers will be more effective. Building relationships and proper planning was considered to be important, as EPs are accountable to funding

bodies as well as to farmers. It was also suggested that EPs need to keep proper records of what they are doing, so that they can learn from their experiences.

> *If you are going to utilize the technology side of things, you need to do it extremely well. So do not think that you can just take information on piece of paper and make it work on internet base system. You need to design that specifically for that medium and have a good understanding of the medium and how people actually use it. So that you can target the way you use it. (JGV)*
>
> *You will not get results, unless you establish trust and ownership. (JPN)*
>
> *You must be prepared to use different means, to give messages across, rather than always using same old ways. So always keep things clear and interesting. (GPV)*

Two EPs suggested that EPs need to be practical, and bring theory into practice in extension events, as farmers always want to see theory put into practice. Both of the participants highlighted that EPs need to demonstrate theory, and always look for activities to engage farmers. They stated that EPs must implement activities on a practical level to help farmers learn and understand, and then adopt practices according to their needs; one added that if extension professionals wanted change then they need to be more practical. As one of the respondent stated,

> *The best practice is achieved when the farmers see the best practice on other farms.* (GGV)

All these suggestions from the participants were intended to help other EPs in the effective delivery of extension strategies.. If they all are incorporated by extension professionals as a whole, it can help in effective implementation and delivery of extension services to meet farmers' needs.

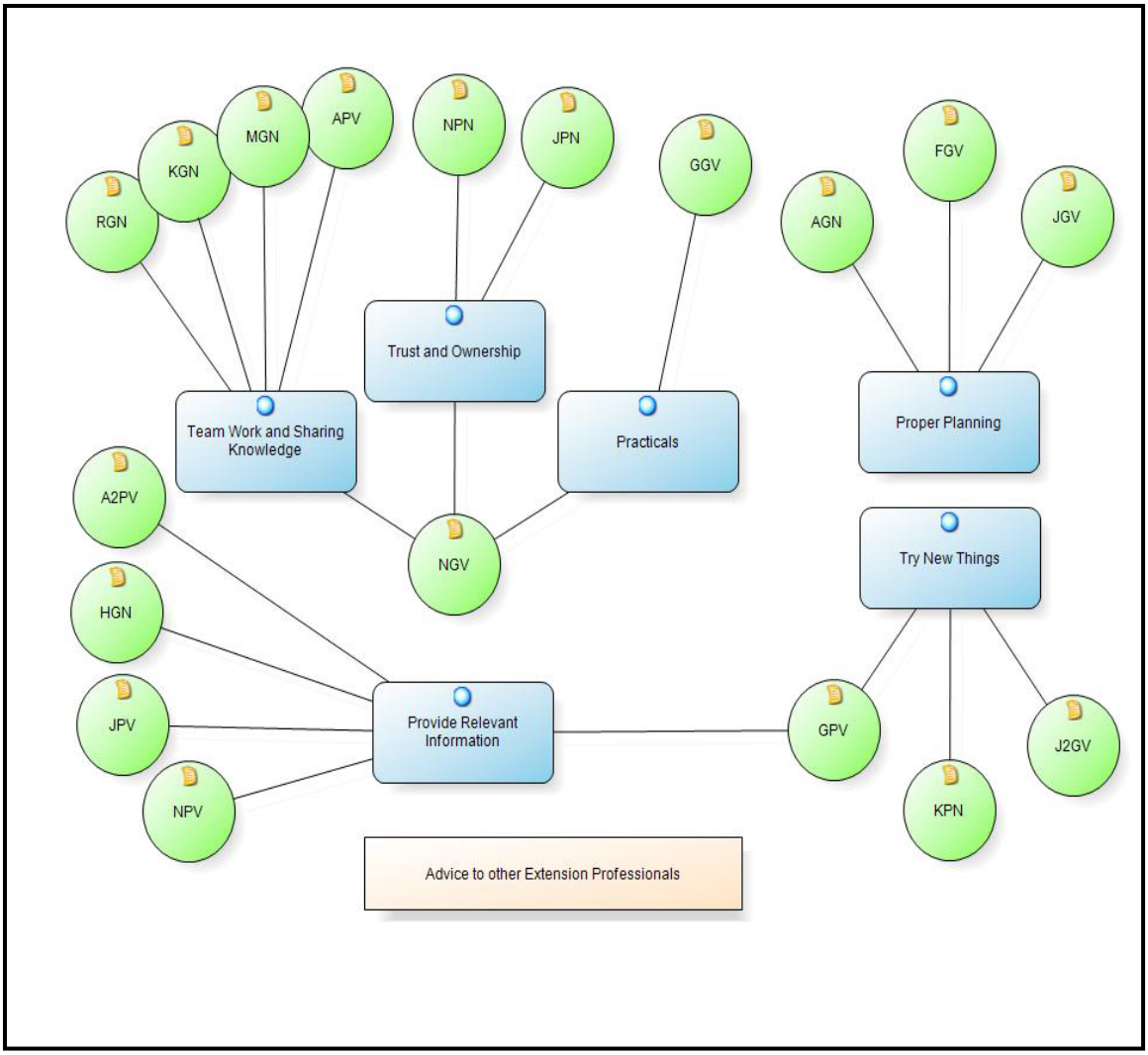

Figure 3.10: Figure representing the participants' advice to other extension professionals for using extension strategies effectively. Each circle represents a participant, while the rectangles are the sub-themes.

3.3.Summary:

The eighteen interviews studied in this case study show the extension strategies adopted by extension professionals and their perceptions to use the strategies effectively. The findings showed that the participants are using four main extension strategies i.e. group, one-to-one, mass media and web based extension. There is a trend of using group extension by government extension professionals; however they also use a 'multiple approach' for engaging farmers in extension activities. Private extension providers are mostly using and in favour of one to one extension, as it was observed that farmers' consider one to one extension as more able to provide an individualised solution to their problems. It was further found that web-based extension helps in adoption of new technologies and networking, and enhances the capacity building of farmers as well as for extension providers. Mass media and informal education were mostly used for information transfer and capacity building.

The general effectiveness of the strategies used was observed from the perceptions of the EPs. The perceptions showed that the strategies used have positive outcomes for dairy farmers. Thus dairy extension in Australia is providing a good platform for the capacity building of farmers as well as EPs. The increased farmers participation and engagement in extension have also resulted in confidence-building of the dairy farmers. EPs are now bringing theory into practice for easier application on farms. Agriculture extension has also considered for targeting farmers for adopting new technologies to attain better production efficiencies and rural development outcomes. The priority of state government is now the development of public and private partnerships; these strong partnerships appear to be helping the effective delivery of extension services.

Extension in Australia has been observed as a constantly developing system of theory and. practice. The use of the different extension strategies together has developed extension as a mixed approach to participatory development, rather than a single 'best method' approach. The bridging task of translating the specialist knowledge for farmers into simple take-home messages have been carried out effectively by the EPs, yet farmers prefer to see this now knowledge put into practice first. This study found that results-oriented and participatory capacity buildings of farmers were the main strengths of the extension strategies used. Moreover, the important strengths were found to be the inter and intra-industry linkages among EPs as well as DFs. The linkages and networking between public and private extension providers helped in coordination and effective

extension delivery. However, farmer to farmer networks also help in experience-sharing and cooperative learning. The primary weakness found was the lack of resources for effective delivery of extension activities.

The study shows that evaluation of the extension strategies varies from organization to organization, and from person to person. There is a trend of internal evaluation among GEPs while the PEPs mostly do external evaluation. The main aim of evaluation was considered to measure impact. It was observed that every strategy has its own applications and impacts. For example, group extension is effective for information transfer to a large number of people; however one to one extension is effective for individual information transfer. Similarly, mass media and web-based extension have their own applications, which are mostly use as supportive extension strategies aligned with the former two extension strategies. In the light of these findings, it would be inappropriate to say that mass media or web-based extension can replace group or one to one extension, but it can help to improve the delivery of extension in more effective ways. It has also been observed that extension services have been expanding in Victoria and contracting in NSW in the last 10 to 15 years. The main reasons for either contraction or expansion were available funding, and the policies and priorities of different governments.

It was observed that, in the past 10 to 15 years, there have been significant technological and management changes in the dairy industry. The changes in nutrition, feeding and milking technologies were found to be effective and significant by the participants. The main role of extension education was to make farmers ready to face and plan for the challenges of the future. In addition, extension education is helping to bring significant changes in the dairy industry. The significant changes relates extension; to provides awareness and information to the farmers, act as a change agent, bridging role between research and farmers, transfer of new technologies, identifying and solving farmers' problems, and helping policies makers.

In the light of this study, in future extension in Australia is considered to bring positive changes in farmer learning programs. However, the EPs will need to adopt more refined methods of facilitation for effective extension delivery. The study also found that social networking among departments, organizations, service providers and farmers will increasingly be the focus of EPs in future. Effective social networking was considered to

help in effective delivery of information, and should result in improved production for the dairy farmers. The study indicated that the uses of web-based technologies for effective delivery of extension will play an important role in future. This will not only help EPs and DFs in their jobs, but will somehow help in attracting young farmers for securing dairy future. Finally, the new approaches of extension along with a specific agricultural or dairy extension provision were also found to be focusing issues like; health and safety, human/animal ethics, climate change, and carbon prices.

Finally, the case study investigated current extension strategies employed by the extension professionals (government and private), and their perceptions regarding the effective use of these strategies. The findings shows that all the four extension strategies can be utilised in Pakistan dairy industry but the most effective will be group extension followed by web based extension.